SEW EURODRIVE

MOVIFIT®-FC

Edition 10/2008
11663014 / EN

Operating Instructions

SEW
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1 General Information

1.1 Use of operating instructions

The operating instructions are an integral part of the product and contain important information for operation and service. The operating instructions are written for all employees who assemble, install, start up, and service this product.

The operating instructions must be kept available in a legible condition. Ensure that persons responsible for the system and its operation, as well as persons who work independently on the unit, have read through the operating instructions completely and understood them. If you are unclear about any of the information in this documentation or require further information, please contact SEW-EURODRIVE.

1.2 Structure of the safety notes

The safety notes in these operating instructions are structured as follows:

Symbol	SIGNAL WORD
	Nature and source of danger Possible consequence(s) if disregarded • Measure(s) to avoid the danger

Symbol	Signal word	Meaning	Consequences if disregarded
Example: General danger Specific danger, e.g. electric shock	**DANGER**	Imminent danger	Severe or fatal injuries
	WARNING	Possible dangerous situation	Severe or fatal injuries
	CAUTION	Possible dangerous situation	Minor injuries
	NOTICE	Possible damage to property	Damage to the drive system or its environment
	TIP	Useful information or tip Simplifies handling of the drive system	

1.3 Rights to claim under warranty

Adhering to the operating instructions is a prerequisite for fault-free operation and the fulfillment of any right to claim under warranty. You should therefore read the operating instructions before you start working with the unit.

Make sure that the operating instructions are available to persons responsible for the plant and its operation as well as to persons who work independently on the unit. You must also ensure that the documentation is legible.

1.4 Exclusion of liability

You must comply with the information contained in these operating instructions to ensure safe operation of MOVIFIT®-FC and to achieve the specified product and performance features. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, any liability for defects is excluded.

1.5 Copyright

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Copyright law prohibits the unauthorized reproduction, modification, distribution, and use of this instruction manual, in whole or in part.

2 Safety Notes

The following basic safety notes are intended to prevent injury to persons and damage to property. The operator must ensure that the basic safety notes are observed and complied with. Ensure that persons responsible for the system and its operation as well as persons who work independently on the unit have read through the operating instructions carefully and understood them. If you are unclear about any of the information in this documentation or if you require further information, please contact SEW-EURODRIVE.

2.1 General information

Never install or start up damaged products. In the event of damage, submit a complaint to the shipping company immediately.

During operation, MOVIFIT®-FC, depending on its degree of protection, may have live, uninsulated, and sometimes moving or rotating parts, as well as hot surfaces.

The unauthorized removal of covers, improper use, incorrect installation or improper operation may result in severe injuries to persons or damage to property.

Consult the documentation for further information.

2.2 Target group

Only **qualified electricians** may perform installation, startup, fault repair, and servicing (observe IEC 60364 or CENELEC HD 384 or DIN VDE 0100 and IEC 60664 or DIN VDE 0110 as well as national accident prevention regulations).

In the context of these basic safety notes, qualified electricians are persons familiar with the installation, assembly, startup, and operation of the product and who possess the qualifications to perform the tasks required of them.

All activity in the other areas of transportation, storage, operation, and disposal must be carried out by persons who are appropriately trained.

2.3 Designated use

MOVIFIT®-FC is a component intended for installation in electrical systems or machines.

When MOVIFIT®-FC is installed in machines, startup of the MOVIFIT®-FC (i.e., start of designated operation) is prohibited until it is determined that the machine meets the requirements stipulated in EC directive 98/37/EC (Machine directive).

Startup (i.e. the start of designated use) is only permitted under observance of the EMC directive (2004/108/EC).

MOVIFIT®-FC meets the requirements stipulated in the low voltage directive 2006/95/EC. The standards contained in the declaration of conformity are used for MOVIFIT®-FC.

Technical data and information on the connection requirements are provided on the nameplate and in the documentation; these must be observed under all circumstances.

2.3.1 Safety functions

MOVIFIT®-FC may not perform any safety functions unless they are described and expressly approved.

For safety applications, ensure that the information in the following publication is observed.

- Safe Disconnection for MOVIFIT®

Use only components in safety applications that were explicitly designed and supplied for this purpose by SEW-EURODRIVE.

2.3.2 Hoist applications

Hoist applications can be implemented with MOVIFIT®-FC only under the following conditions:

- Hoist applications are possible only in connection with the function levels "Classic" or "Technology".
- A hoist startup must be performed.

Do not use MOVIFIT®-FC as a safety device in hoist applications. Use monitoring systems or mechanical protection devices as safety equipment to avoid possible damage to property or injury to people.

2.4 Other applicable documentation

In addition, note the following publication:

- "DR/DV/DT/DTE/DVE AC Motors, CT/CV Asynchronous Servomotors" operating instructions
- "AC Motors DRS/DRE/DRP" operating instructions

2.5 Transportation and storage

Observe the notes on transportation, storage and proper handling. Observe the climatic conditions as stated in the "Technical Data" sections.

2.6 Installation

The units must be installed and cooled according to the regulations in the relevant documentation.

Protect MOVIFIT®-FC from excessive strain.

The following applications are prohibited unless the unit is explicitly designed for such use:

- Use in potentially explosive areas
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc.
- Use in non-stationary applications with strong mechanical oscillation and impact loads; see section "Technical Data".

2.7 Electrical connection

Observe applicable national accident prevention guidelines when working on a live MOVIFIT®-FC (e.g., BGV A3).

Electrical installation must be carried out according to pertinent regulations (e.g. line cross sections, fusing, and protective earth connection). The documentation contains additional information.

You will find notes on EMC-compliant installation (e.g., shielding, grounding, configuration of filters, and routing of lines) in the MOVIFIT®-FC documentation. The manufacturer of the system or machine is responsible for observing the limits established by EMC legislation.

Protective measures and protection devices must comply with the regulations in force (e.g. EN 60204 or EN 61800-5-1).

2.8 Safe disconnection

MOVIFIT®-FC meets all requirements for safe disconnection of power connections and electronic connections in accordance with EN 61800-5-1. In order to guarantee safe disconnection, all connected circuits must also satisfy the requirements for safe disconnection.

2.9 Operation

Systems into which MOVIFIT®-FC is installed may also need to be equipped with additional monitoring and protection devices, according to the applicable safety regulations; these include the law governing technical equipment and accident prevention regulations. Additional protective measures may be necessary for applications with increased potential risk. Changes to MOVIFIT®-FC using the operating software are permitted.

Do not touch live components or power connections immediately after disconnecting MOVIFIT®-FC from the supply voltage as there may still be some charged capacitors. Wait for at least 1 minute after having switched off the supply voltage.

As soon as supply voltage is present at MOVIFIT®-FC, the terminal box must be closed (i.e. the MOVIFIT®-EBOX and any hybrid cable connector must be connected and screwed on).

Never disconnect the EBOX for MOVIFIT®-FC or any power plug connectors during operation. Doing so can lead to dangerous electric arcs forming, which can cause irreparable damage to the unit (fire risk, irreparable contacts).

Important: The MOVIFIT® maintenance switch disconnects only the integrated frequency inverter from the mains. The terminals of MOVIFIT®-FC are still connected to the supply voltage after the maintenance switch is activated.

The unit may still be live and connected to the mains, even if the operation LEDs and other display elements are no longer illuminated.

Mechanical blocking or the unit's internal safety functions can cause a motor standstill. Eliminating the cause of the problem or performing a reset can result in the drive re-starting automatically. If, for safety reasons, this is not permitted for the driven machine, disconnect the unit from the mains before correcting the fault.

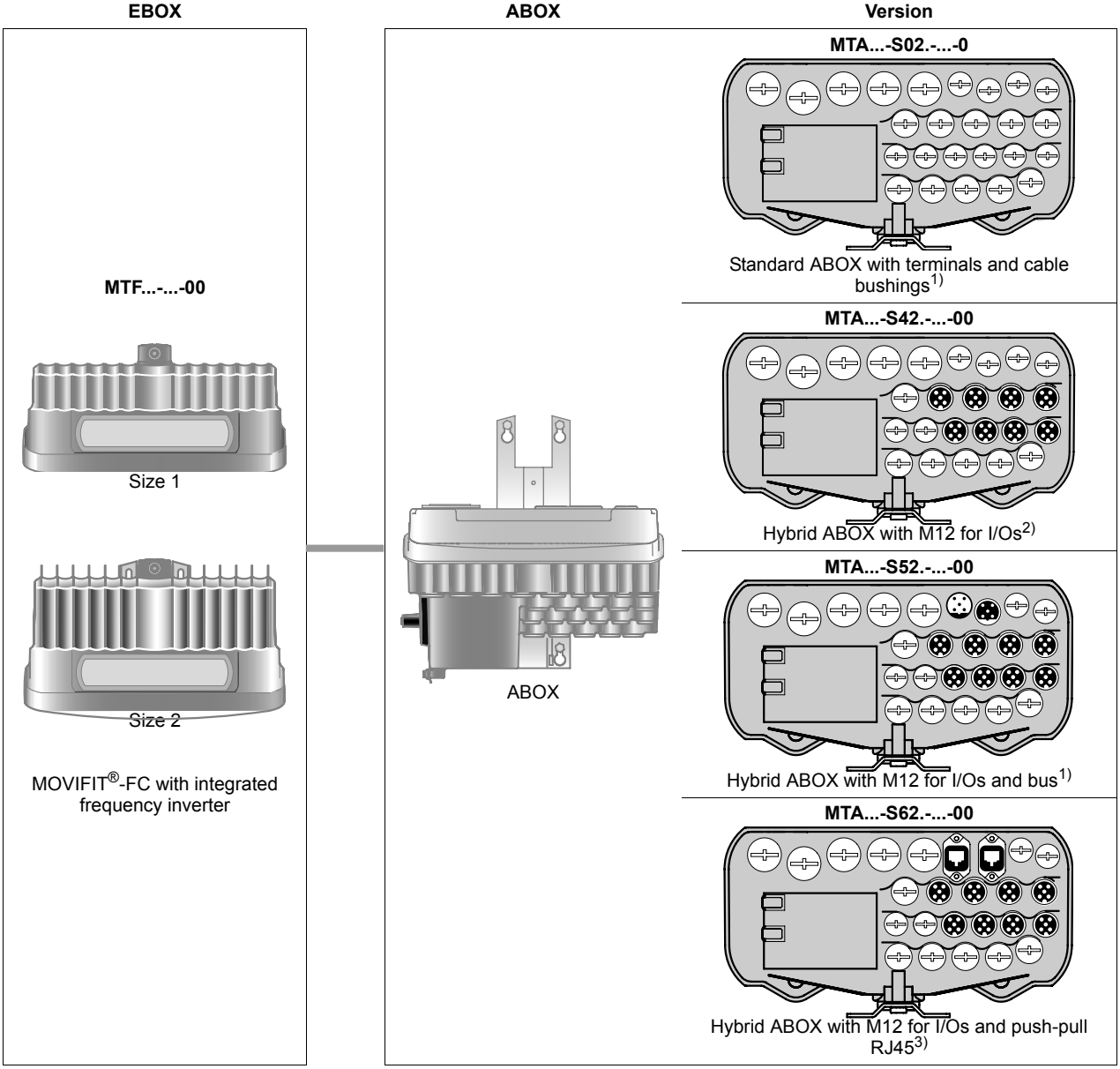
Caution – Danger of burns: The surface temperature of MOVIFIT®-FC and the external options (e.g. the braking resistor heat sink) can exceed 60°C (140°F) during operation.

3 Unit Design

3.1 Overview

3.1.1 Combinations in connection with standard ABOX and hybrid ABOX

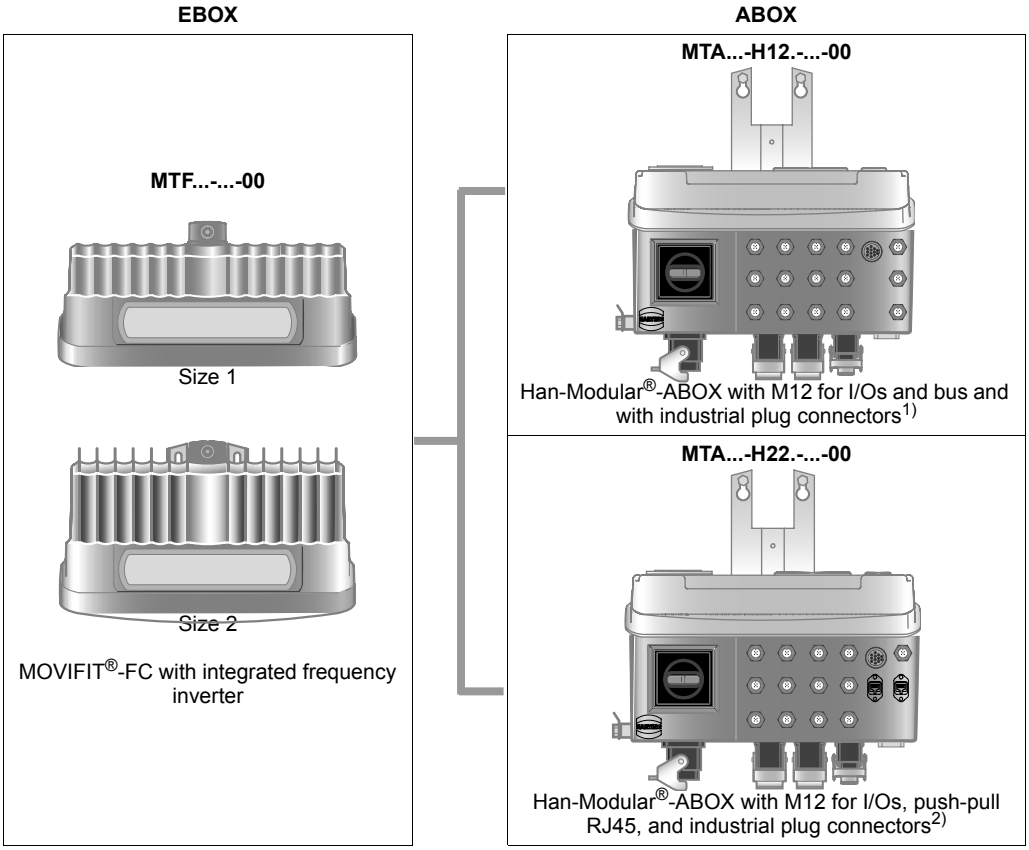
The following figure shows the MOVIFIT® versions described in these operating instructions using the standard ABOX and hybrid ABOX.



1) With DeviceNet: micro-style connector for DeviceNet connection
2) Not available with DeviceNet
3) Not available with DeviceNet or PROFIBUS

3.1.2 Combinations in connection with Han-Modular®-ABOX

The figure that follows shows the MOVIFIT® versions described in these operating instructions with the Han-Modular®-ABOX.



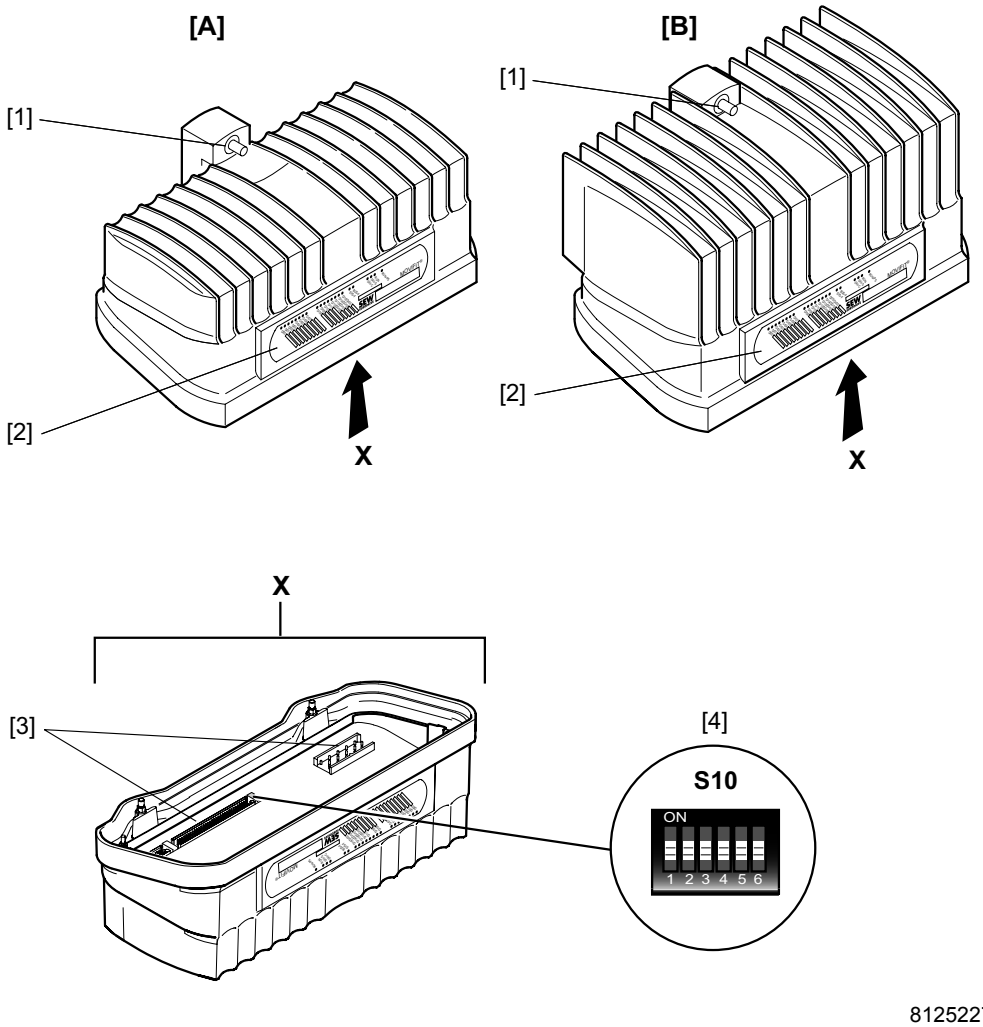
1) With DeviceNet: Micro-style connector for DeviceNet connection

2) Not available in connection with DeviceNet or PROFIBUS

3.2 EBOX (active electronics unit)

The MOVIFIT®-FC EBOX is a closed electronics unit with a communication interface, I/Os, and a frequency inverter:

EBOX "MTF...-....-00"



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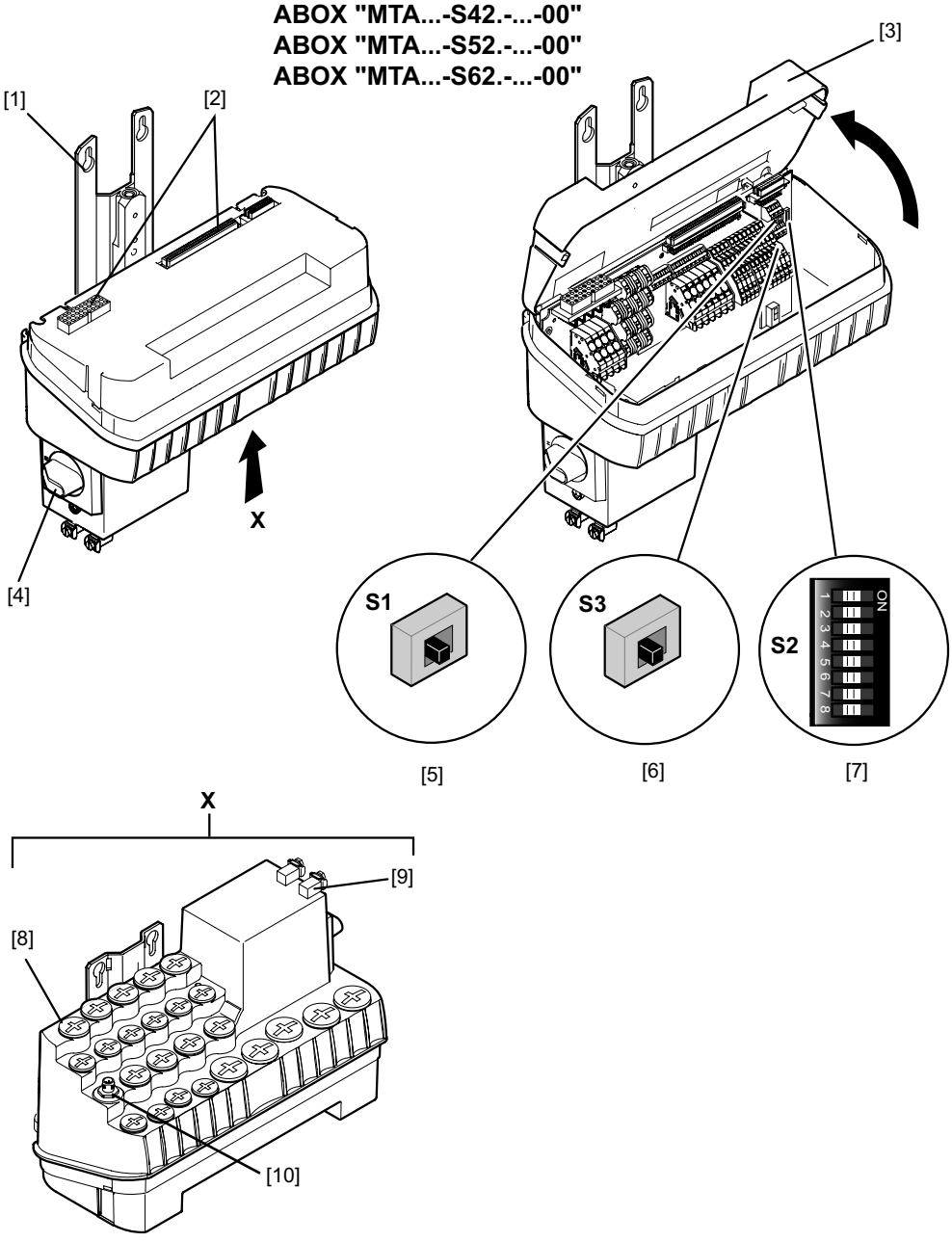
[A] Size 1
[B] Size 2
[1] Central opening/closing mechanism
[2] Operation LEDs for I/Os (can be labeled), communication, and unit status
[3] Connection to connection box
[4] DIP switch S10 for unit functions

3.3 ABOX (passive connection unit)

3.3.1 Standard ABOX and hybrid ABOX

The following figure gives an example of the MOVIFIT® standard ABOX/MOVIFIT® hybrid ABOX:

ABOX "MTA...-S02.-...-00"
ABOX "MTA...-S42.-...-00"
ABOX "MTA...-S52.-...-00"
ABOX "MTA...-S62.-...-00"



812524427

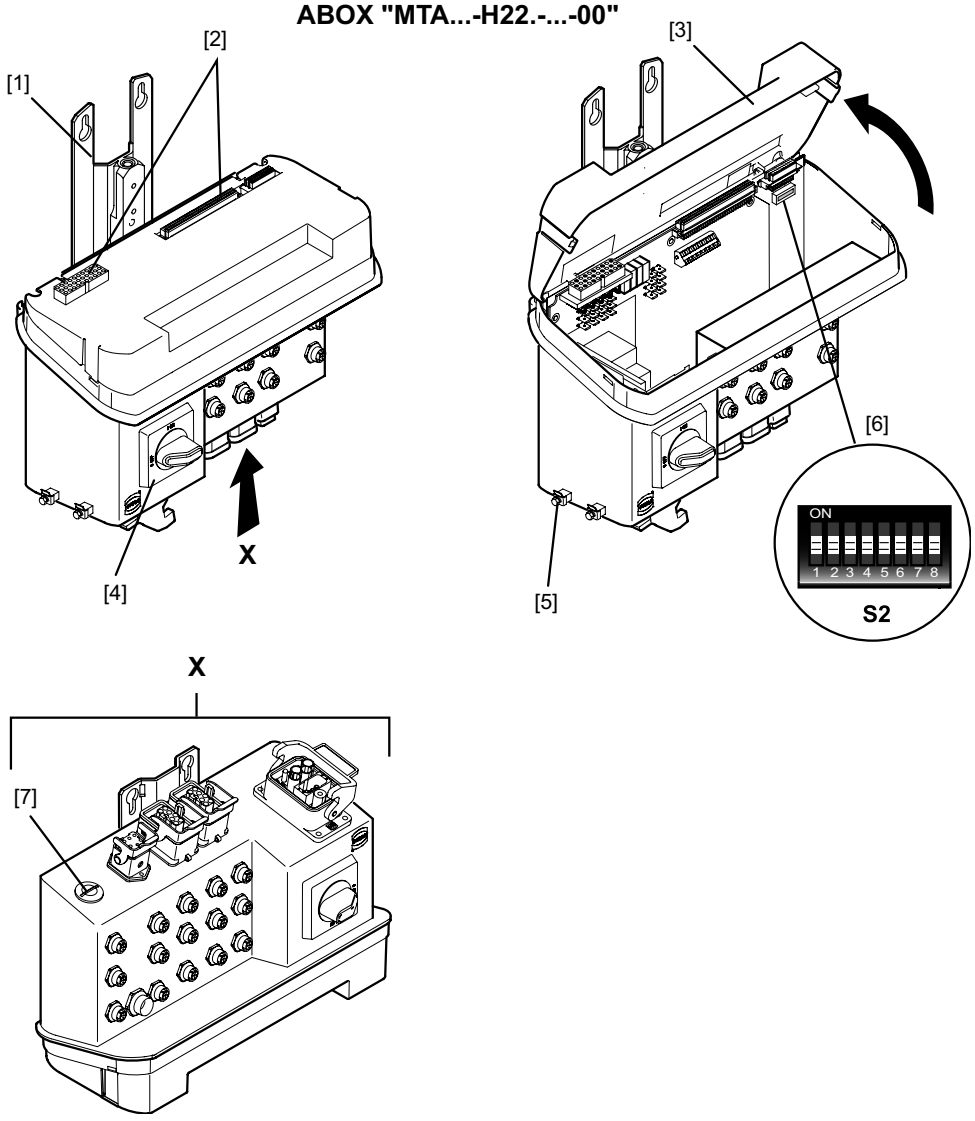
[1] Mounting rail
[2] Connection to EBOX
[3] Protection cover
[4] Maintenance switch
[5] DIP switch S1 for bus termination (PROFIBUS version only)
[6] DIP S3 switches for SBus bus termination
[7] DIP switch S2 for bus address (PROFIBUS and DeviceNet version only)
[8] Diagnostic interface below screw connection
[9] Grounding screws
[10] Micro-style connector (DeviceNet version only)

3.3.2 Han-Modular®-ABOX

The following figure depicts the Han-Modular® connection box with Han-Modular® and M12 plug connector:

	TIP
	The figure below shows an example of the connection technology of the PROFIBUS version. For more detailed information on other variants, refer to section "Electrical Installation".

ABOX "MTA...-H12.-...-00"
ABOX "MTA...-H22.-...-00"



812501131

[1] Mounting rail
[2] Connection to EBOX
[3] Protection cover
[4] Maintenance switch
[5] Grounding screws
[6] DIP switch S2 for bus address (PROFIBUS and DeviceNet version only)
[7] Diagnostic interface below screw connection

3.4 Hygienic^{plus} version (optional)

3.4.1 Properties

The Hygienic^{plus} version has the following characteristics:

- IP66 in accordance with EN 60529 and IP69K in accordance with DIN 40050-9 (MOVIFIT® housing closed and all cable bushings sealed according to the relevant degree of protection)
- Easy-to-clean housing (self-draining design)
- Surface with anti-adhering properties
- High impact resistance of the surface against mechanical damage
- Compatibility with cleansing agents having the following properties:
  - Alkaline
  - Acidic
  - Disinfectant

  Never mix cleaning and disinfecting agents.

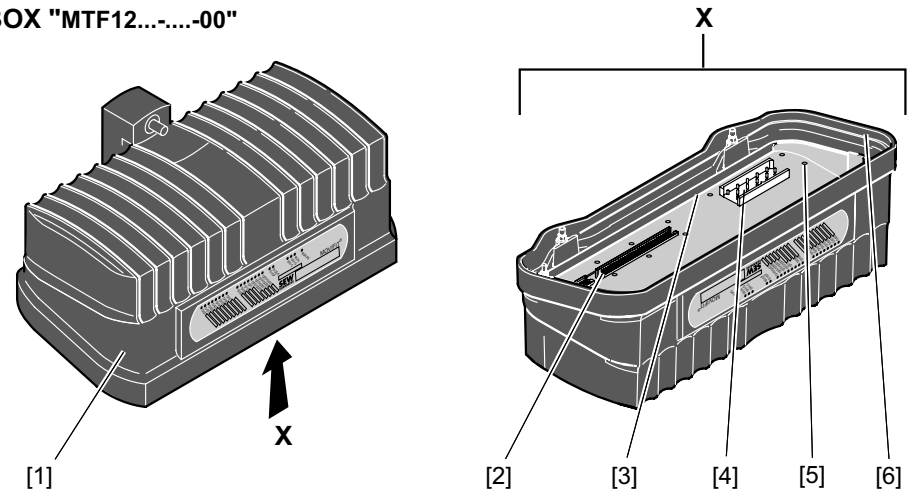
  Never mix acids and chlorine alkalis, as poisonous chlorine gas will result.

  Strictly observe the safety instructions of the cleaning agent manufacturer.
- Resistant to temperature fluctuations
- Not sensitive to condensation due to connection boards with a special surface treatment

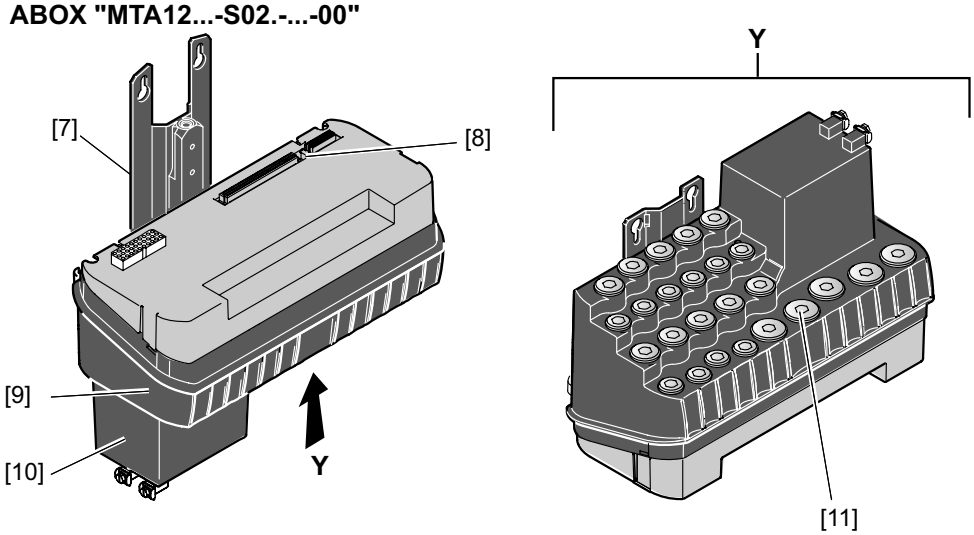
	TIP
	The Hygienic^{plus} design is only available in connection with the standard ABOX, "MTA12...-S02.-...-00". For additional features of the Hygienic^{plus} version, refer to section "Technical Data".

The following figure depicts the additional features of MOVIFIT® units in the optional Hygienic^{plus} version:

EBOX "MTF12...-....-00"



ABOX "MTA12...-S02.-...-00"



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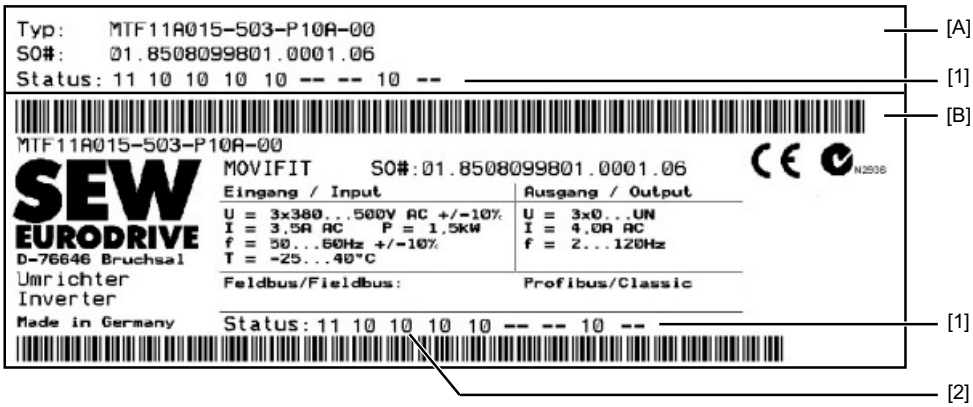
[1] EBOX with special surface treatment (only available in one color)
[2] Signal plug connector with gasket
[3] Gasket between ABOX and coverplate
[4] Power plug connector with gasket
[5] Screws with thread sealant
[6] Replaceable profile seal
[7] Mounting rail with special surface treatment (only available in one color)
[8] Connection board with increased resistance to moisture condensation (special surface treatment)
[9] ABOX with special surface treatment (only available in one color)
[10] With the Hygienic^{plus} version: generally without maintenance switch
[11] Stainless steel screw plugs (optionally available)

3.5 MOVIFIT®-FC unit designation

3.5.1 Sample EBOX nameplate



[A] External nameplate
[B] Internal nameplate
[1] EBOX status field
[2] Firmware status

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MT F 11 A 015- 50 3 - P1 0 A - 00 / S11

EBOX option
S11 = PROFIsafe option S11[1)]

EBOX version
00 = DT/DV motor 400 V, 50 Hz
01 = DAS motor 400 V, 50 Hz
10 = DRS motor 400 V, 50 Hz
11 = DRE motor 400 V, 50 Hz
12 = DRS motor 460 V, 60 Hz
13 = DRE motor 460 V, 60 Hz
16 = DRP motor 400 V, 50 Hz
17 = DRP motor 460 V, 60 Hz

A = Version

Function level
0 = Classic
1 = Technology
2 = System

Fieldbus
P1 = PROFIBUS
D1 = DeviceNet
E2 = PROFINET
Z1 = SBus slave
E3 = EtherNet/IP, Modbus/TCP

Connection type
3 = 3-phase

Connection voltage
50 = AC 380-500 V

Unit power
003 = 0.37 kW
005 = 0.55 kW
007 = 0.75 kW
011 = 1.1 kW
015 = 1.5 kW
022 = 2.2 kW
030 = 3.0 kW
040 = 4.0 kW

Version A

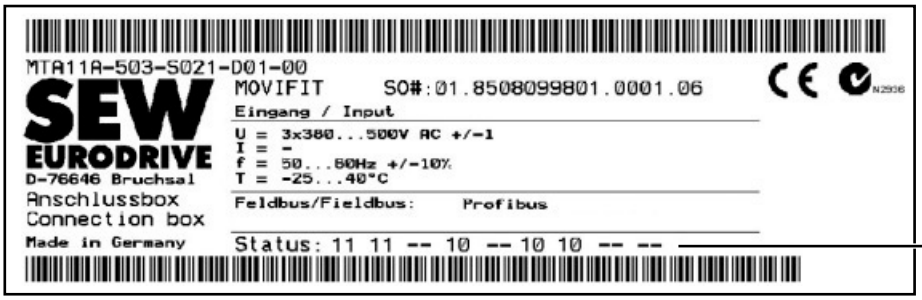
Series
11 = Standard
12 = Hygienic[plus]

Unit type
F = MOVIFIT®-FC

MT = MOVIFIT® unit series

1) Available only in connection with PROFIBUS or PROFINET IO

3.5.2 Sample ABOX nameplate



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[1] ABOX status field

MT A 11 A - 50 3 -S02 1 - D 01 - 00 / BW1

ABOX option
BW1 / BW2 = Integrated braking resistor
M11 = Stainless steel mounting rail

ABOX version
00 = Series

Maintenance switch type
01 = With rotary button (ABB)

Maintenance switch version
D = Switch disconnector

Fieldbus
1 = PROFIBUS
2 = DeviceNet
3 = EtherNet/IP, PROFINET, Modbus/TCP

Connection configuration

S02 =	Standard ABOX with terminals and cable bushings
S42 =	Hybrid ABOX with M12 for I/Os
S52 =	Hybrid ABOX with M12 for I/Os + bus
S62 =	Hybrid ABOX with M12 for I/Os and push-pull RJ45 for bus
H12 =	Han-Modular®-ABOX with M12 for I/Os + bus and industrial plug connectors
H22 =	Han-Modular®-ABOX with M12 for I/O, push-pull RJ45, and industrial plug connectors

Connection type
3 = 3-phase (AC)

Connection voltage
50 = 380-500 V

A = Version

Series
11 = Standard
12 = Hygienic^{plus} version

Unit type
A = Connection box

MT = MOVIFIT® unit series

4 Mechanical Installation

4.1 Installation instructions

- Mount MOVIFIT® only on a level, vibration-proof and torsionally rigid support structure, as described in the section "Approved installation position".
- Use suitable cable glands (use reducing adapters if necessary). For versions with plug connectors, make sure to use the matching mating connectors.
- Use screw plugs to seal cable entries not in use.
- Use protective caps to seal plug connectors not in use.

⚠ CAUTION

Risk of injury due to protruding parts, especially the mounting rail.

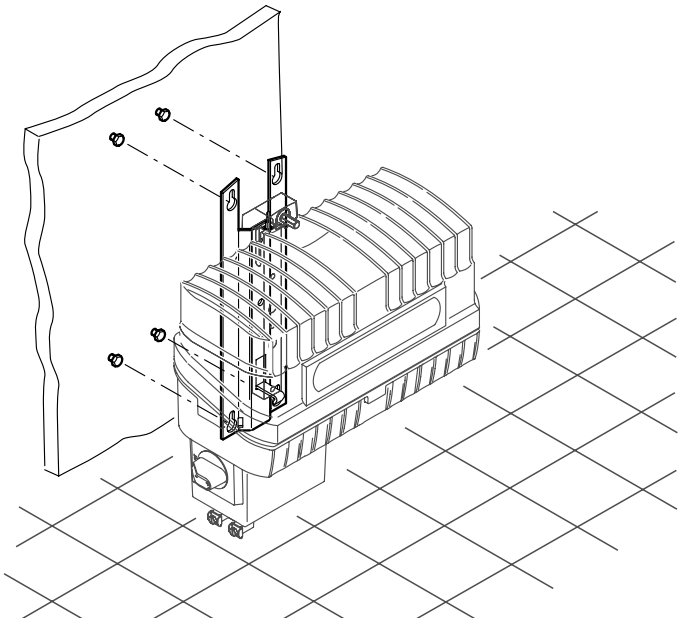
Risk of cutting or crushing.

- Cover sharp and protruding parts, especially the mounting rail, to protect against injury and damage.
- Make sure that only trained specialists carry out the installation.

4.2 Approved installation position

The following figure depicts the approved installation position for MOVIFIT®.

MOVIFIT® is attached by means of a mounting plate using the four screws already installed in the mounting surface. For further information, refer to section "Assembly instructions" (see page 21).



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TIP

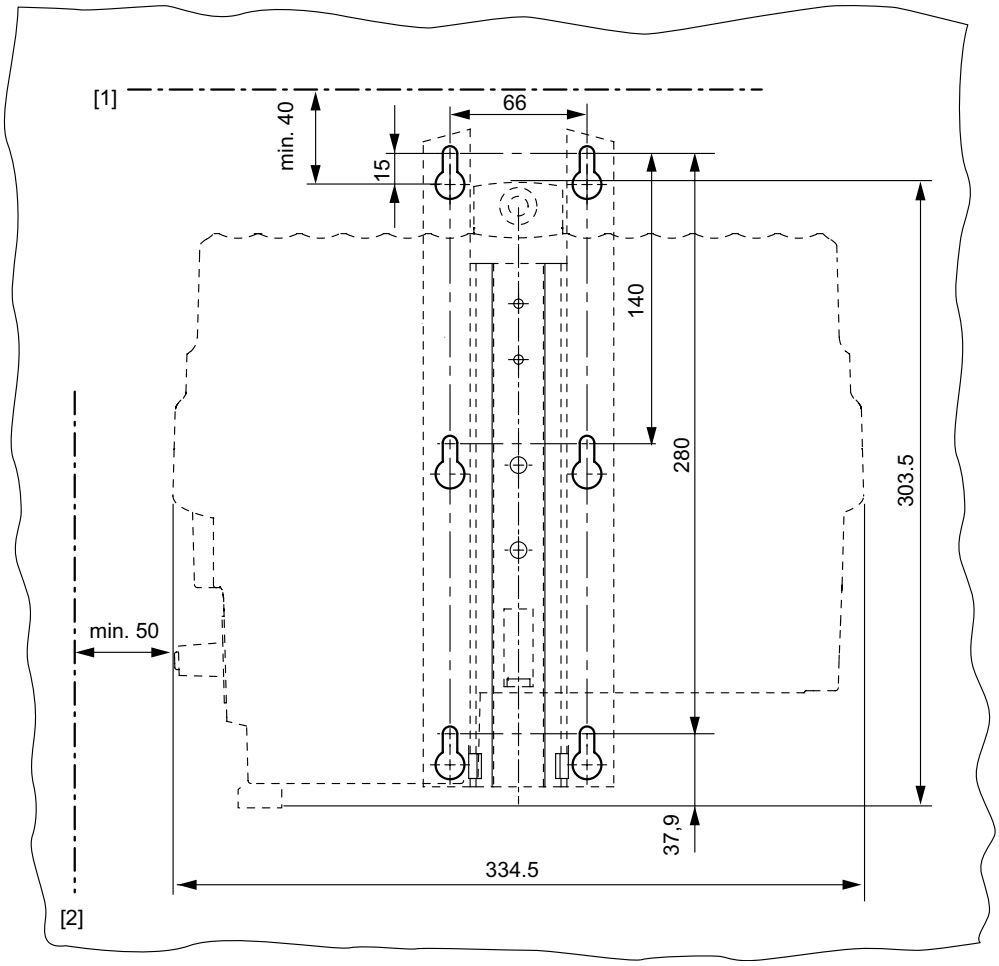
This section uses the version with terminals and cable bushings as an example. However, the assembly instructions are applicable for all versions.

4.3 Assembly instructions

1. Drill the holes necessary to secure at least four screws to the mounting surface as shown in the following figure. SEW-EURODRIVE recommends using screw size M6 and, depending on the base, suitable dowel pins, if necessary.

   Size 1

   In conjunction with a standard mounting rail:

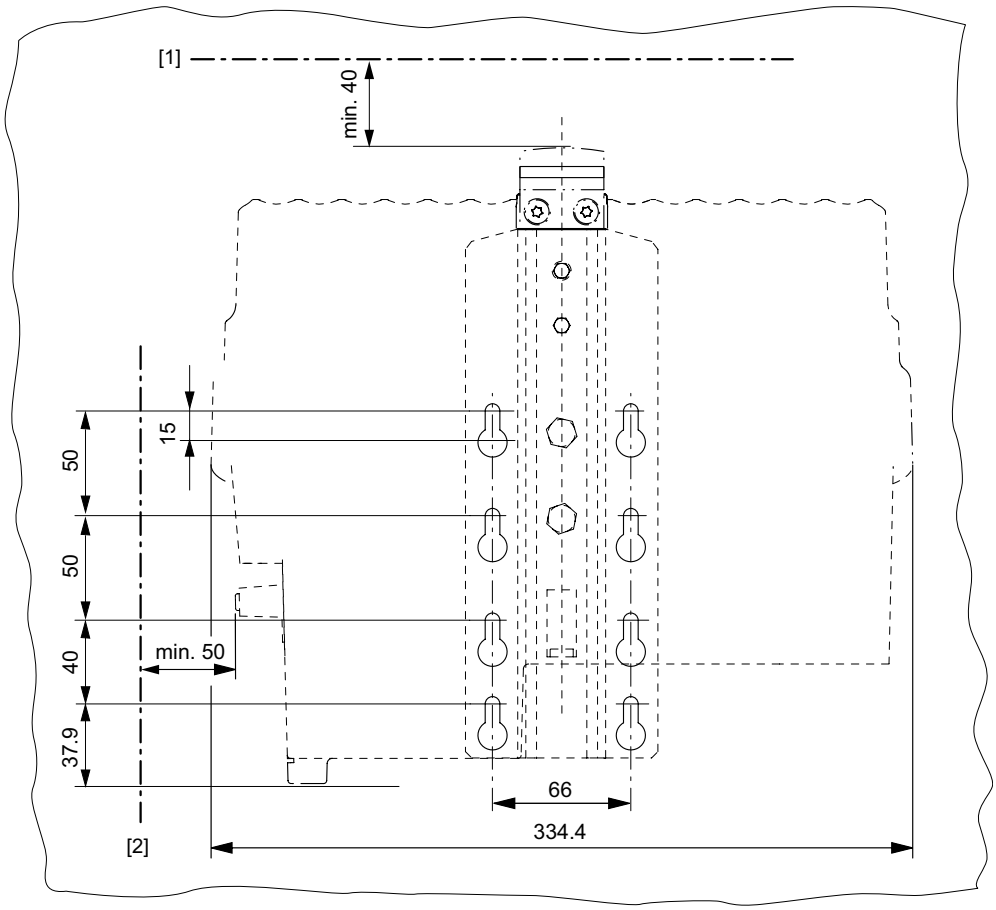


758540299

	TIPS
	• [1] Observe the minimum installation clearance so that the EBOX can be removed from the ABOX. • [2] Observe the minimum installation clearance required to operate the maintenance switch and to ensure heat dissipation for the unit. For detailed dimension drawings, see the section "Dimension drawings" (see page 146).

Size 1

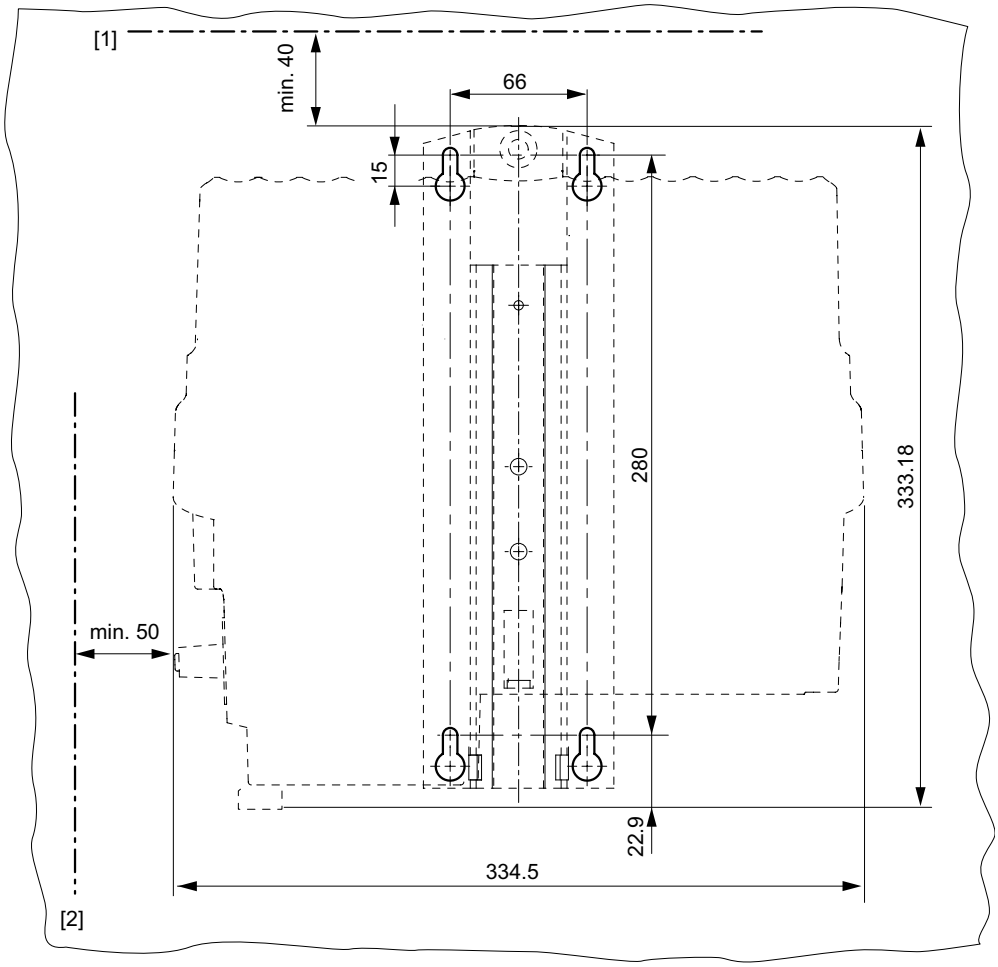
In conjunction with the optional M11 stainless steel mounting rail:



799309835

	TIPS
	• [1] Observe the minimum installation clearance so that the EBOX can be removed from the ABOX. • [2] Observe the minimum installation clearance required to operate the maintenance switch and to ensure heat dissipation for the unit. For detailed dimension drawings, see the section "Dimension drawings" (see page 146).

Size 2:

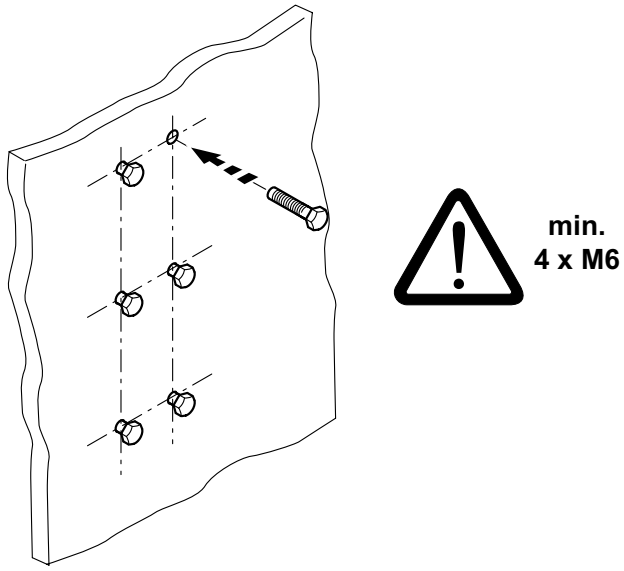


812584331

	TIPS
	• [1] Observe the minimum installation clearance so that the EBOX can be removed from the ABOX. • [2] Observe the minimum installation clearance required to operate the maintenance switch and to ensure heat dissipation for the unit. For detailed dimension drawings, see the section "Dimension drawings" (see page 146).

2. Mount at least 4 screws on the mounting surface. SEW-EURODRIVE recommends using screw size M6 and, depending on the base, dowel pins, if necessary.

   Use appropriate washers or screw and washer assemblies for the mounting plates with special surface treatment on the Hygienic^{plus} version.



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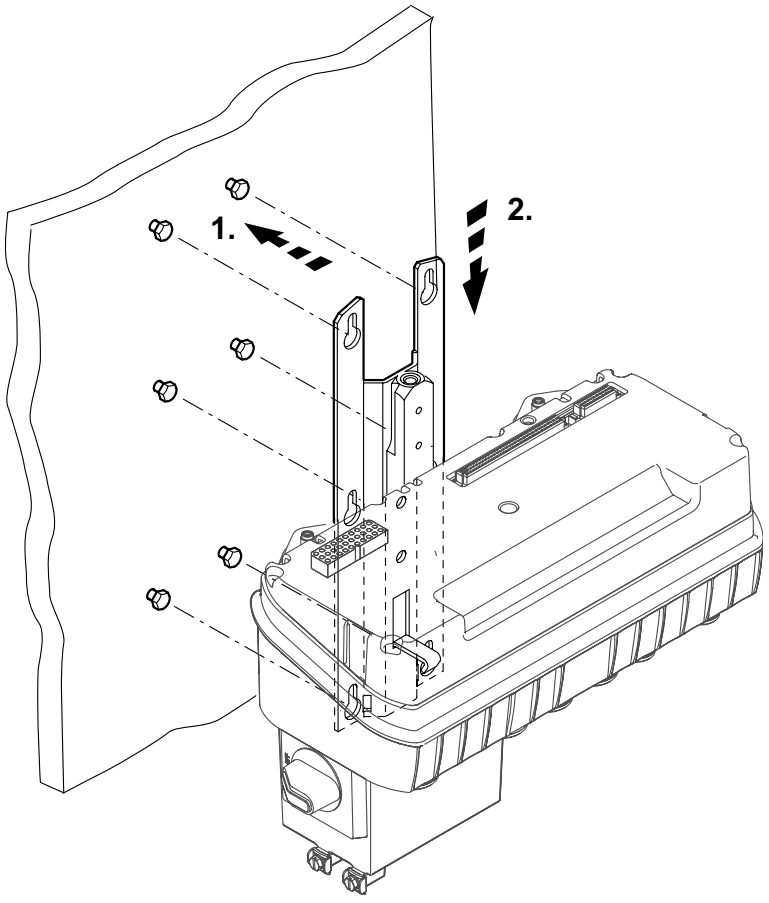
3. Attach the ABOX to the screws using the mounting plate.



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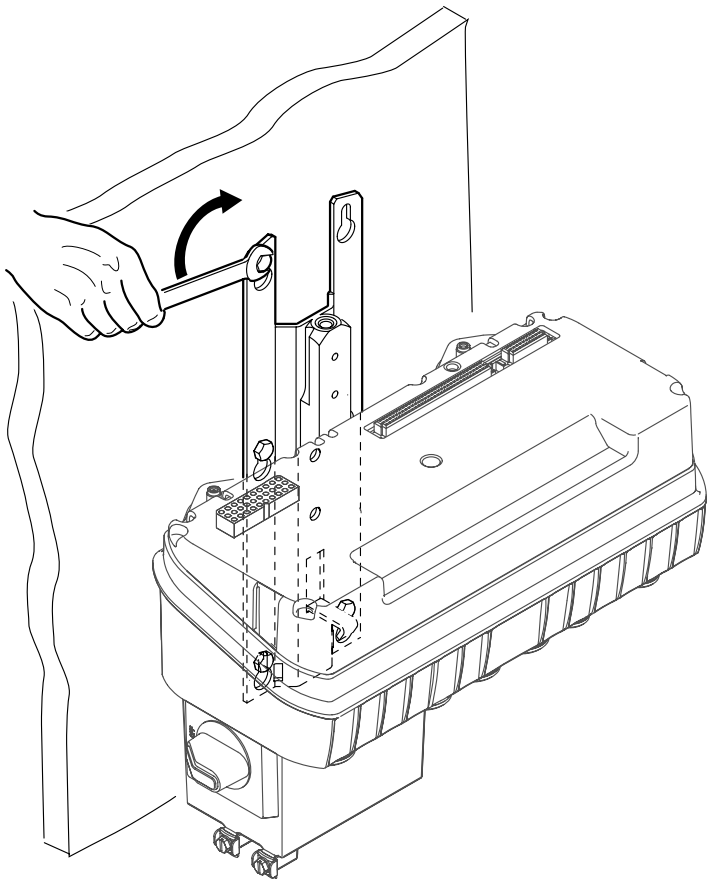
4. Tighten the screws.

	⚠ CAUTION
	Danger due to falling load Minor injuries • You will have to tighten at least 4 wall screws to ensure a secure fit after mounting.



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4.4 Central opening/closing mechanism

⚠ WARNING

The surface temperature of the MOVIFIT®-FC can be very high during operation.

Danger of burns

- Do not touch MOVIFIT®-FC until it has cooled down sufficiently.

NOTICE

If the torque is too high, the central opening/closing mechanism can be destroyed.

- Tighten the retaining screw up to the stop using a tightening torque of 7 Nm (60 lb.in).

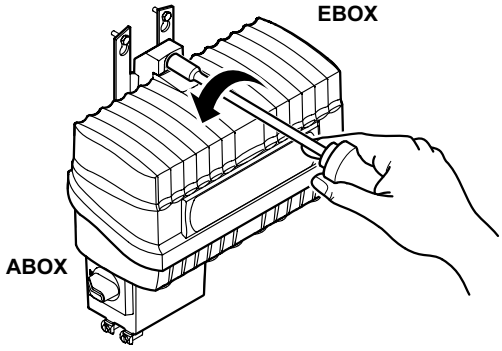
The degree of protection specified in the technical data only applies when a unit is mounted correctly. When the EBOX is removed from the ABOX, moisture, dust, or foreign particles can damage the MOVIFIT®.

- Protect the ABOX and EBOX when the unit is open.

4.4.1 Opening the unit

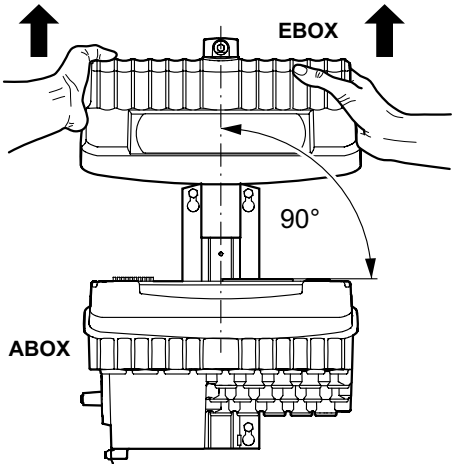
A socket wrench (SW8) is required for the central retaining screw.

1. Loosen the central retaining screw and continue to turn it counterclockwise until the EBOX stops moving further up.



813086859

2. Remove the EBOX from the ABOX by lifting it upwards. Do not twist the EBOX.

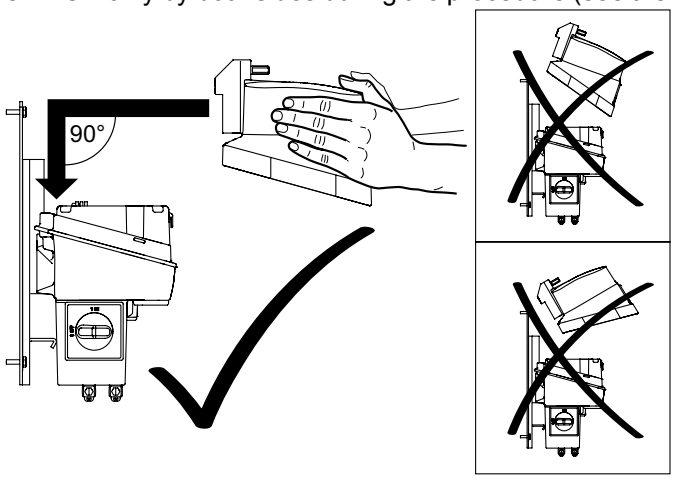


813353099

4.4.2 Closing the unit

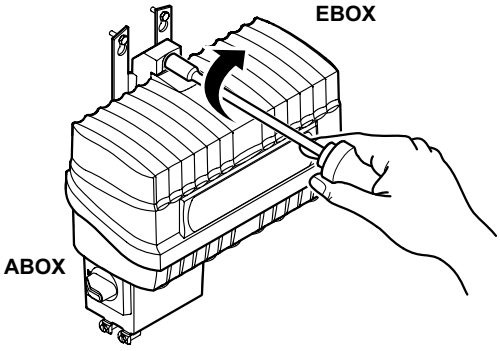
A socket wrench (SW8) is required for the central retaining screw.

1. Position the EBOX on the ABOX.
   - Do not twist the EBOX.
   - Hold the EBOX only by both sides during the procedure (see the following figure).



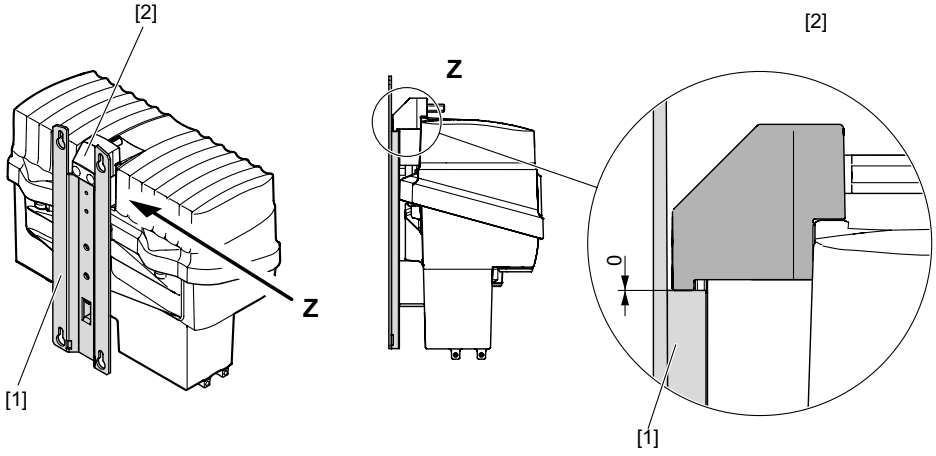
813362059

2. Tighten the retaining screw up to the stop using a tightening torque of 7 Nm (60 lb.in).



813384075

3. MOVIFIT® is closed correctly when the redirector of the closing mechanism [2] is on the mounting plate [1].

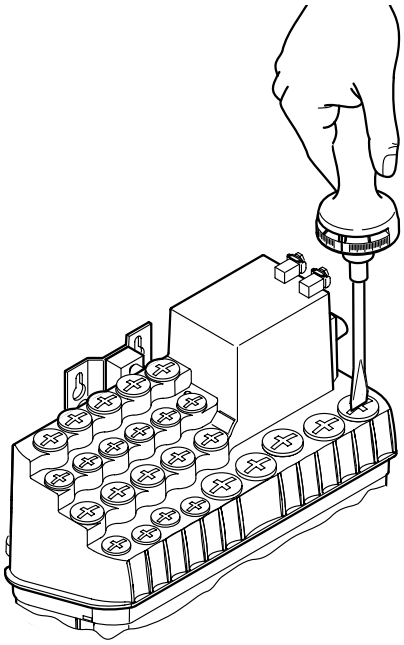


813392395

4.5 Tightening torques

4.5.1 Blanking plugs

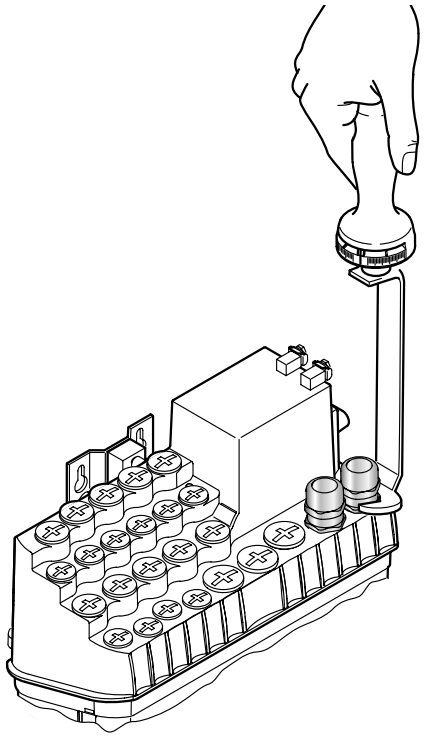
Tighten the blanking plugs optionally supplied by SEW-EURODRIVE using a tightening torque of 2.5 Nm (22 lb.in):



758614667

4.5.2 EMC cable glands

Tighten the EMC cable glands optionally supplied by SEW-EURODRIVE to the following torques:



758624523

Screw connection	Part number	Size	Tightening torque
EMC cable glands (nickel-plated brass)	1820 478 3	M16 x 1.5	3.5 Nm to 4.5 Nm (31-40 lb.in)
	1820 479 1	M20 x 1.5	5.0 Nm to 6.5 Nm (44-57 lb.in)
	1820 480 5	M25 x 1.5	6.0 Nm to 7.5 Nm (53-66 lb.in)
EMC cable glands (stainless steel)	1821 636 6	M16 x 1.5	3.5 Nm to 4.5 Nm (31-40 lb.in)
	1821 637 4	M20 x 1.5	5.0 Nm to 6.5 Nm (44-57 lb.in)
	1821 638 2	M25 x 1.5	6.0 Nm to 7.5 Nm (53-66 lb.in)

The cable retainer in the cable gland must withstand the withdrawal force of the cable from the cable gland as follows:

- Cable with outer diameter > 10 mm: ≥ 160 N
- Cable with outer diameter < 10 mm: = 100 N

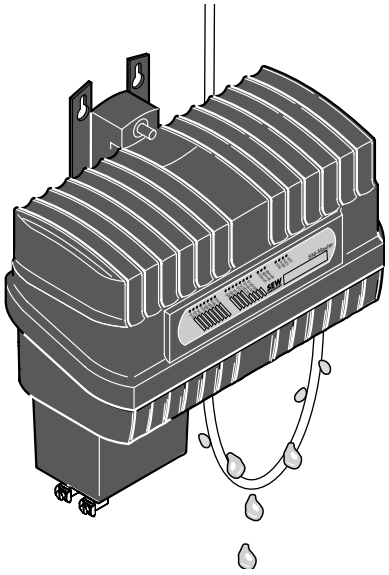
4.6 MOVIFIT® Hygienic^{plus} version

	TIPS
	SEW-EURODRIVE guarantees that the Hygienic^{plus} special surface treatment is free from faults when delivered. Report any damage that has occurred during transport immediately. Although the special surface treatment has a high impact resistance, the housing surfaces are to be handled with care. The corrosion protection can be affected by damage to the special surface treatment resulting from improper handling during transport, installation, operation, cleaning, etc. SEW-EURODRIVE is not liable for such damage.

4.6.1 Installation notes

Observe the following additional notes when installing the Hygienic^{plus} version of MOVIFIT®-FC:

- Make sure to prevent moisture and dirt from entering the unit during the installation.
- After electrical installation and during assembly, make sure all gaskets and sealing surfaces are clean and undamaged.
- Check the state of the profile gasket in the EBOX when performing maintenance work. If damaged: Consult SEW-EURODRIVE.
- The IP69K degree of protection is achieved only if the plastic screw plugs delivered as standard are replaced by suitable IP69K screw connections (see page 145) and the approved mounting position is observed (see page 20).
- Make sure to install the cable with a drip loop; see the following figure:



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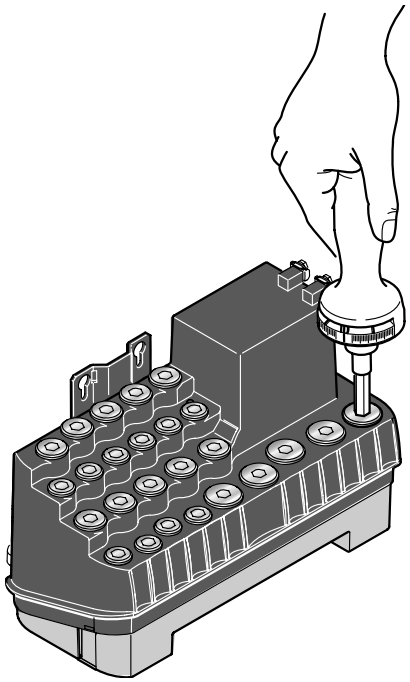
4.6.2 Tightening torques for Hygienic^{plus} version

	CAUTION
	The IP69K degree of protection is achieved only if the plastic screw plugs delivered as standard are replaced by suitable IP69K screw connections. Refer to section "Optional metal screw connections" (see page 145) for screw connections available from SEW-EURODRIVE. Only the listed stainless steel screw connections are suitable for IP69K.

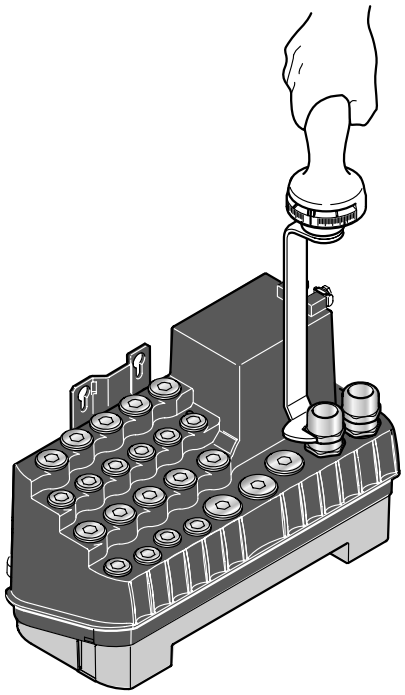
Blanking plugs Tighten the blanking plugs optionally supplied by SEW-EURODRIVE to 2.5 Nm (22 lb.in).



512774539

EMC cable glands

Tighten the EMC cable glands optionally supplied by SEW-EURODRIVE to the following torques:



512772875

Screw connection	Part number	Size	Tightening torque
EMC cable glands (nickel-plated brass)	1820 478 3	M16 x 1.5	3.0 Nm to 4.0 Nm (26-35 lb.in)
	1820 479 1	M20 x 1.5	3.5 Nm to 5.0 Nm (31-44 lb.in)
	1820 480 5	M25 x 1.5	4.0 Nm to 5.5 Nm (35-49 lb.in)
EMC cable glands (stainless steel)	1821 636 6	M16 x 1.5	3.5 Nm to 4.5 Nm (31-40 lb.in)
	1821 637 4	M20 x 1.5	5.0 Nm to 6.5 Nm (44-57 lb.in)
	1821 638 2	M25 x 1.5	6.0 Nm to 7.5 Nm (53-66 lb.in)

The cable retainer in the cable gland must withstand the withdrawal force of the cable from the cable gland as follows:

- Cable with outer diameter > 10 mm: ≥ 160 N
- Cable with outer diameter < 10 mm: = 100 N

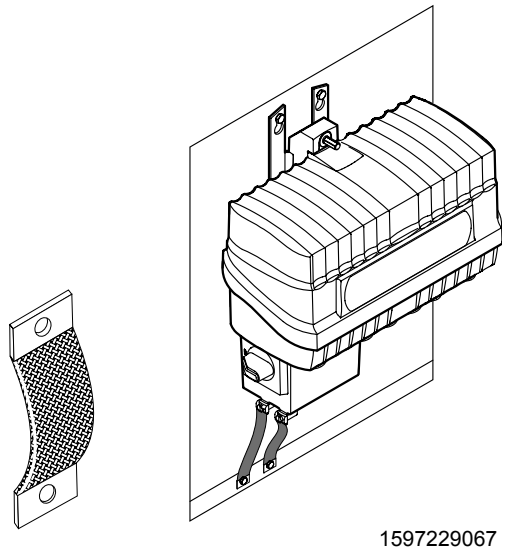
5 Electrical Installation

5.1 Installation planning taking into account EMC aspects

Successful installation of decentralized drives depends on selecting the correct cables, providing correct grounding, and a functioning equipotential bonding.

Always apply the **relevant standards**. Consider the following points:

- **Equipotential bonding**
  - Low-impedance, HF-capable equipotential bonding must be provided independently of the protective earth connection (see also VDE 0113 or VDE 0100 part 540); e.g. by:
    - Large surface area for connection of MOVIFIT® mounting rail to the system
      (untreated, unpainted, uncoated mounting surface)
    - Use of flat grounding strips (HF litz wire) between MOVIFIT® and system grounding point
    - Low-impedance, HF-capable connection between connected motor and system grounding point



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  - Do not use the line shield of data lines for equipotential bonding.
- **Data lines and 24 V supply**
  - Must be routed separately from cables subject to interference (e.g. control cables from solenoid valves, motor cables).
- **Connection between MOVIFIT® and motor**
  - SEW-EURODRIVE recommends using pre-fabricated SEW hybrid cables especially designed for connecting MOVIFIT® units and motors.
- **Line shields**
  - Must have good EMC properties (high shield attenuation).
  - May not serve only as mechanical protection for the cable
  - Must be connected to a wide area of the unit's metal housing at the cable ends; see also section "Connecting the PROFIBUS cable" (see page 47) and section "Connecting the hybrid cable" (see page 48).

	TIP
	Additional information is available in the SEW publication "Drive Engineering – Practical Implementation, EMC in Drive Engineering".

5.2 Installation instructions (all versions)

5.2.1 Connecting supply system cables

- The rated voltage and frequency of the MOVIFIT® frequency inverter must match the data for the supplying mains.
- Cable cross section: According to input current I_{mains} for rated power (see Technical Data)
- Install the line fuse at the beginning of the supply system cable behind the supply bus junction. Use D, D0, NH fuses or circuit breakers. Select the fuse size according to the line cross section.
- Use contactor switch contacts in utilization category AC-3 according to IEC 158 to connect MOVIFIT® drives.
- Switch the MOVIFIT®-FC output with inhibited output stage only.

5.2.2 Earth-leakage circuit breakers

- Do not use a conventional earth-leakage circuit breaker as a protective device. Universal current-sensitive earth-leakage circuit breakers (trip current 300 mA) are permitted for use as protective devices. During normal operation of MOVIFIT®, earth-leakage currents of > 3.5 mA can occur.
- SEW-EURODRIVE recommends that you do not use earth-leakage circuit breakers. However, if an earth-leakage circuit breaker (FI) is specified as a direct or indirect touch guard, observe the following note in accordance with EN 61800-5-1:

⚠ WARNING

Wrong type of earth-leakage circuit breaker installed

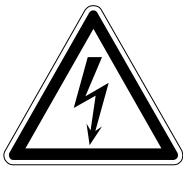
Severe or fatal injuries

- MOVIFIT® can cause direct current in the protective earth. In cases where an earth-leakage circuit breaker (FI) is used for protection against direct or indirect contact, only an earth-leakage circuit breaker (FI) of type B on the external power supply side of the MOVIFIT® is permitted.

5.2.3 Mains contactor

- Only use a contactor of utilization category AC3 (EN 60947-4-1) as a mains contactor.

5.2.4 Notes on PE connection and/or equipotential bonding

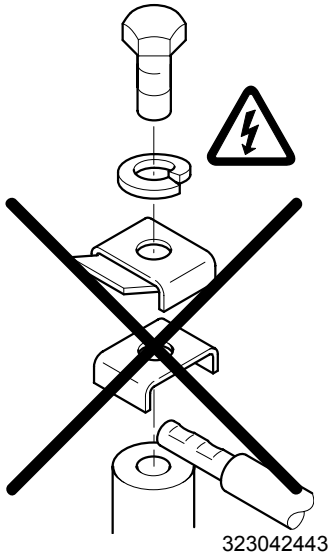
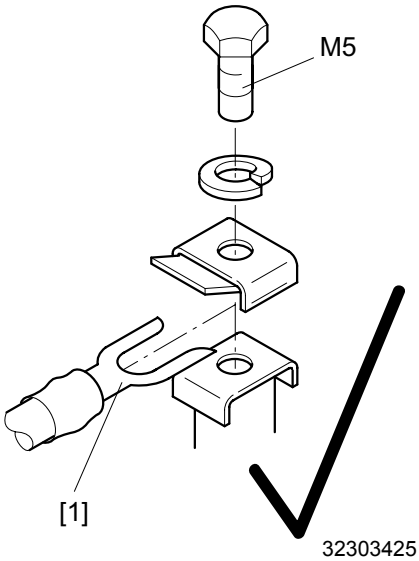
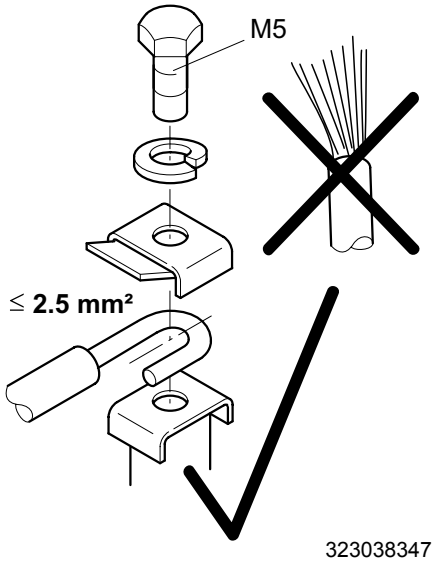


⚠ DANGER

Incorrect connection of PE

Severe or fatal injuries or damage to property from electric shock

- The permitted tightening torque for the screw connection is 2.0-2.4 Nm (18-21 lb.in).
- Observe the following notes regarding PE connection:

Prohibited assembly procedure	Recommendation: Assembly with forked cable lug Permitted for all cross sections	Assembly with solid connecting wire Permitted for cross sections up to max. 2.5 mm²
		

[1] Forked cable lug suitable for M5 PE screws

Earth-leakage currents ≥ 3.5 mA may occur during normal operation. To meet the requirements of EN 61800-5-1, observe the following note:

- Route a second PE conductor with the cross section of the supply system cable in parallel to the protective earth via separate terminals, or use a copper protective earth conductor with a cross section of 10 mm^2.

5.2.5 Definition PE, FE

- **PE** refers to the mains-side protective earth connection. The PE conductor in the mains connection cable may only be connected with terminals marked with "PE" (these are designed for the maximum permissible mains connection cross-section).
- **FE** refers to connections for "functional ground". You can connect any existing grounding conductor in the 24 V connection cable.

⚠ DANGER

Important: Do not connect the mains-side PE to terminals marked with FE (functional ground).

These connections are not designed for this purpose and therefore electrical safety is not guaranteed.

Severe or fatal injuries or damage to property from electric shock

- The PE conductor in the mains connection cable may only be connected with terminals marked with "PE" (these are designed for the maximum permissible mains connection cross-section).

5.2.6 Meaning of the 24 V voltage levels

MOVIFIT®-FC has a total of 4 different 24 V potential levels, each electrically isolated from the others:

- 1) 24V_C: C = Continuous
- 2) 24V_S: S = Switched
- 3) 24V_P: P = Power section
- 4) 24V_O: O = Option

Depending on the requirements of the application, these can either be isolated, supplied externally, or connected to each other via a X29 distributor terminal.

1) 24V_C = Electronics and sensor supply

The MOVIFIT® control electronics and the sensors connected to the sensor supply outputs VO24_I, VO24_II, and VO24_III are supplied by 24V_C. Usually, this supply voltage may not be switched off for operation as MOVIFIT® can, in this case, no longer be addressed via the fieldbus or network, and the sensor signals can no longer be processed. The unit also requires a certain amount of time to start up when switched on again.

2) 24V_S = Actuator supply

The digital outputs DO.. and the actuators connected to them are supplied by 24V_S. The sensor supply output VO24_IV is also supplied by 24V_S, while the digital inputs DI12 to DI15 are at the reference potential 0V24_S (as these can be connected to the outputs on the same connections as an alternative). Depending on the application, the supply voltage can be switched off for operation to specifically deactivate the actuators in the system centrally.

3) 24V_P = Inverter supply

The integrated frequency inverter is supplied with 24 V from 24V_P. Depending on the application, 24V_P can be supplied by either 24V_C or 24V_S (via jumpers at X29), or it can be supplied externally. In this case, you must ensure that the integrated frequency inverter is no longer supplied with 24 V when switching off the voltage. This generally prompts an error message.

⚠ DANGER

During safe disconnection, 24V_P must be connected over a suitable emergency stop relay or a safety control.

Severe or fatal injuries

- Observe the permissible wiring diagrams and safety conditions in the SEW publication "Safe Disconnection for MOVIFIT®".

4) 24V_O = Option supply

The integrated option card and the sensor/actuator interfaces available on it are supplied by 24V_O.

With PROFIsafe option S11, the complete safety electronics and the safe inputs/outputs are supplied by 24V_O.

⚠ DANGER

When using PROFIsafe option S11, please observe the SEW publication "Safe Disconnection for MOVIFIT®".

Severe or fatal injuries

- When using PROFIsafe option S11, observe the permissible wiring diagrams and safety conditions in the SEW publication "Safe Disconnection for MOVIFIT®".

Depending on the application, the 24V_O can be supplied by either 24V_C or 24V_S (via jumpers at X29), or it can be supplied externally. In this case, note that the entire option card with the connected sensors and actuators is no longer supplied when voltage is disconnected. This generally prompts an error message.

Connection of voltages

Both voltages 24V_C and 24V_S can be connected via terminal X20 with a large line cross-section and further looped to the next unit as "24 V power bus". The voltages 24V_P and 24V_O should be connected to terminal X29.

TIP

For connection examples, refer to section "Power bus connection examples" (see page 80).

5.2.7 Plug connectors

All MOVIFIT® plug connectors are illustrated in these operating instructions with a contact end view.

5.2.8 Operating braking resistors

The supply cables to the braking resistors carry a high pulsed DC voltage during rated operation.

⚠ WARNING

The surfaces of the braking resistors get very hot when the braking resistors are loaded with P_{rated}.

Risk of burns and fire

- Choose a suitable location for installing the braking resistors.
- Do not touch the braking resistors.

5.2.9 Protective devices

MOVIFIT® drives are equipped with integrated overload protection devices, which make external devices obsolete.

5.2.10 EMC-compliant installation

With respect to the EMC regulation, frequency inverters cannot be operated as stand-alone units. Regarding EMC, they can only be evaluated when they are integrated in a drive system. Conformity is declared for a described, CE-typical drive system. These operating instructions contain further information.

TIPS

- This is a product with restricted availability in accordance with IEC 61800-3. It may cause EMC interference. In this case, it may be recommended for the operator to carry out suitable measures.
- For detailed information on EMC-compliant installation, refer to the publication "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.

5.2.11 UL-compliant installation

- Use only copper conductors with a temperature range of 75°C as connection cables.
- MOVIFIT®-FC is designed for operation on voltage supply systems with a maximum supply current of AC 5,000 A and a maximum rated voltage of AC 500 V.
- As unit fuses for MOVIFIT®-FC, use UL-compliant fuses whose performance data does not exceed 25 A/600 V.
- Units in connection with ABOXes MTAxxx-M11-xx or MTAxxx-M12-xx have branch circuit protection.
- For UL-compliant installation, only the EBOX specified on the ABOX nameplate may be mounted to the ABOX. The UL certification refers only to the ABOX/EBOX combination stated on the nameplate.
- For UL-compliant installation, the load capacity of the X1 power terminal is limited to a maximum of 25 A (sum of the device current and the pass-through current to connected devices).
- For UL-compliant installation, the maximum ambient temperature of the "MTF1.A040-503-…" is limited to 35°C (with P_{rated} reduction: 3% I_N per K to max. 55°C)

	TIP
	The UL certification only applies for operation on voltage supply systems with voltages to ground of max. 300 V. UL approval does not apply for operation on voltage supply systems with a non-grounded star point (IT systems).

5.2.12 Installation altitude higher than 1,000 m above sea level

MOVIFIT® with supply voltages of 380 to 500 V can be used at altitudes of more than 1,000 m (3,281 ft) above sea level up to a maximum of 4,000 m (13,123 ft) above sea level under the following peripheral conditions:

- The rated continuous power is reduced based on the reduced cooling above 1,000 m (see section "Technical Data").
- At 1,000 m (3,281 ft) above sea level and higher, the air and creeping distances are only sufficient for overvoltage class 2. If the installation calls for overvoltage class 3, you will have to install additional external overvoltage protection to limit overvoltage peaks to 2.5 kV phase-to-phase and phase-to-ground.
- If safe electrical disconnection is required, it must be implemented outside the unit at altitudes of more than 2,000 m (6,561 ft) above sea level (safe electrical disconnection in accordance with EN 61800-5-1 and EN 60204).
- Up to 2,000 m above sea level, the permitted rated supply voltage is 3 x 500 V. Every 100 m, it is reduced by 6 V to a maximum of 3 x 380 V at 4,000 m above sea level.

5.2.13 Wiring check

Before connecting the system to the power source for the first time, you must perform a wiring check to prevent injuries to persons and/or damage to systems and equipment caused by incorrect wiring. Perform this check as follows:

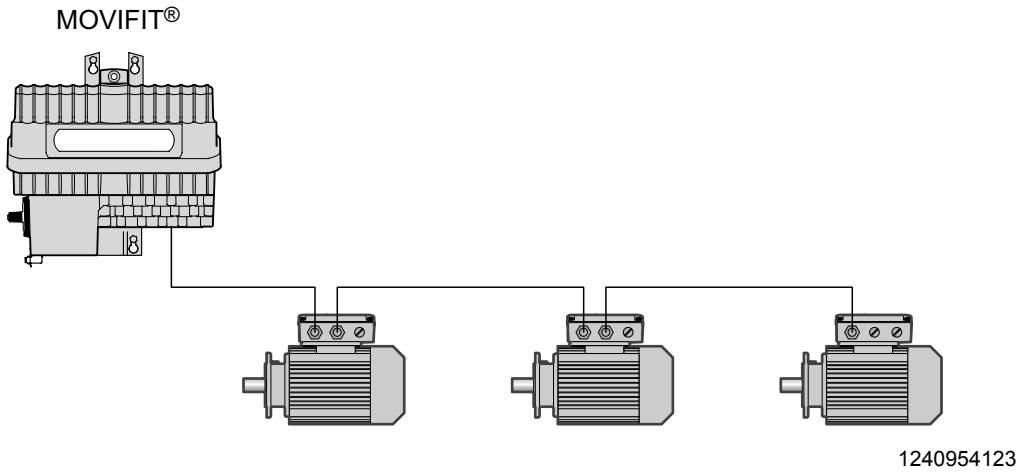
- Remove all electronic units (EBOX) from the connection units (ABOX).
- Check the insulation of the wiring in accordance with applicable national standards.
- Check the grounding.
- Check the insulation between the supply system cable and the DC 24 V cable.
- Check the insulation between mains cable and communication cable.
- Check the polarity of the DC 24 V cable.
- Check the polarity of the communication cable.
- Ensure equipotential bonding between the MOVIFIT® units.

After the wiring check

- Install and fasten all electronics units (EBOX).
- Seal all cable openings and plug connections that are not in use.

5.3 Additional installation instructions for group drives

The following figure shows the prescribed installation for group drives with MOVIFIT®-FC:



When installing such group drives, also follow the installation instructions below:

- Connect no more than 3 motors in series connection to the MOVIFIT®-FC unit. The sum of the rated motor currents may not exceed the MOVIFIT®-FC rated unit current.
- The sum of all cable sections between MOVIFIT®-FC and the motors may not exceed 15 m.
- Monitoring the temperature of the motors using TF is **not** permitted.

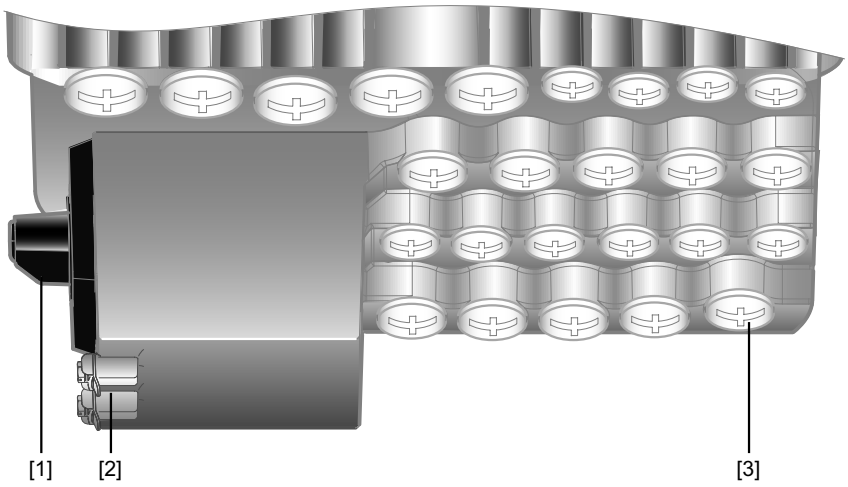
  Each motor must have a TH for temperature monitoring. Connect the THs in series connection to the MOVIFIT®-FC unit.
- The motor brakes may be controlled using constant voltage only (alternative brake control system at startup using MOVITOOLS® MotionStudio). The rated voltage of all connected brakes must be equal.

	TIPS
	• For more information on motor/brake startup, refer to the MOVIFIT® function level "Classic" or "Technology" manual. • When several motors are controlled by a MOVIFIT®-FC drive (group drive), the internal motor protection model does not protect the connected motors against overheating. For this reason, the drive must have an internal or external braking resistor. The braking resistor is used to dissipate the regenerative energy when the motor brakes.

5.4 Standard ABOX "MTA...-S02.-...-00"

5.4.1 Description

The following figure depicts the standard ABOX with "MTA...-S02.-...-00" terminals and cable bushings:



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[1] Maintenance switch (option)
[2] PE connection
[3] Diagnostics socket (RJ10) under the screw connection

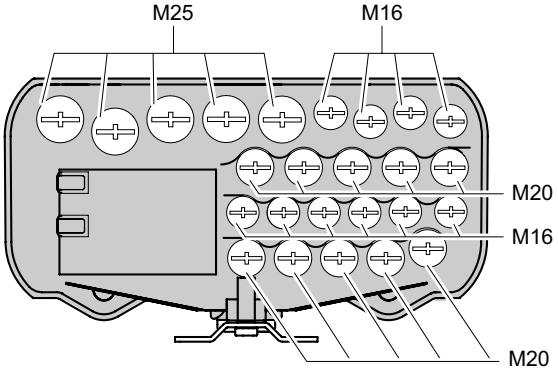
5.4.2 Variants

The following variants of the standard ABOX are available for MOVIFIT®-FC (MTF):

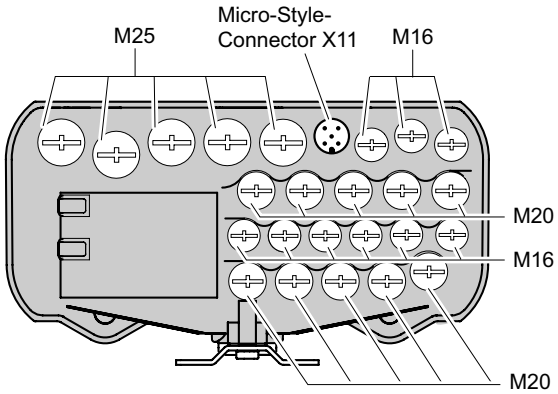
- MTA11A-503-S0**2**.-...-00:
  - Optional external braking resistor
  - Optional integrated braking resistor
  - Optional switch disconnector

The following figure shows the screw connections and plug connectors of the standard ABOX depending on the fieldbus interface:

PROFIBUS MTA11A-503-S0.**1**-...-00
PROFINET MTA11A-503-S0.**3**-...-00
EtherNet/IP MTA11A-503-S0.**3**-...-00
Modbus/TCP MTA11A-503-S0.**3**-...-00



DeviceNet MTA11A-503-S0.**2**-...-00



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5.4.3 Additional installation instructions for "MTA...-S02.-...-00"

Permitted connection cross section and current-carrying capacity of the terminals

Terminal data	X1 / X20	X8 / X9	X25 / X30 / X31 / X35 / X45 / X81 / X91	X29
Connection cross section (mm^2)	0.2 mm^2 – 6 mm^2	0.08 mm^2 – 4[1] mm^2	0.08 mm^2 – 2.5[1] mm^2	0.2 mm^2 – 1.5[1] mm^2
Connection cross section (AWG)	AWG 24 - AWG 10	AWG 28 – AWG 12[1]	AWG 28 – AWG 14[1]	AWG 24 – AWG 16[1]
Current-carrying capacity (max. continuous current)	X1: 32 A[2] X20: 16 A	20 A	10 A	10 A
Conductor stripping length	13-15 mm	8-9 mm	5-6 mm	5-6 mm

1) The maximum permitted cross section is reduced by one unit when conductor end sleeves are used (e.g. 2.5 mm^2 → 1.5 mm^2).

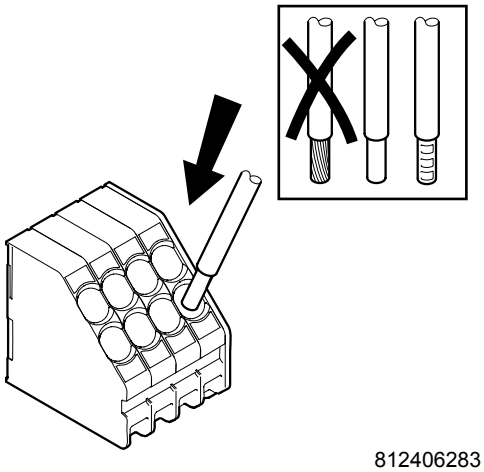
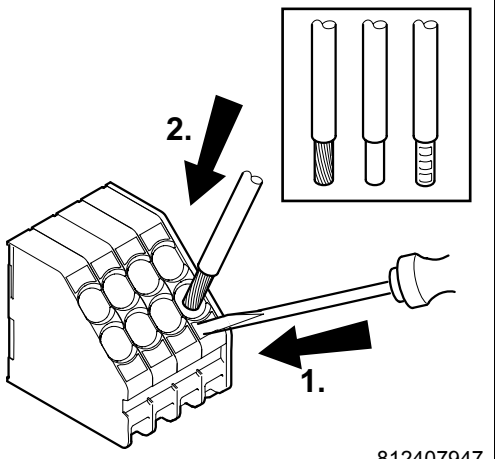
2) According to standard EN 61800-5-1, the temperature of the connection terminals may be 15°C above the permitted rated temperature of the performance isolation. Therefore, you may use only connection cables that are heat resistant up to 90°C. As an alternative, you can to limit the looping current.

Conductor end sleeves

Use conductor end sleeves without insulating shrouds for terminals X1, X20, X8, and X9 (DIN 46228 part 1, material E-CU).

Enabling the terminals

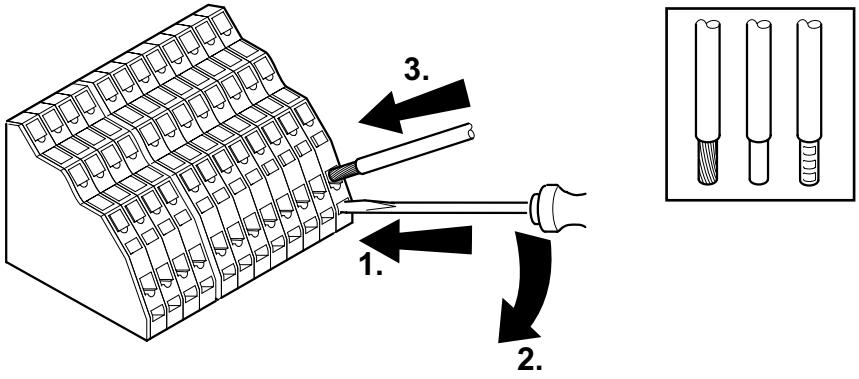
Terminals X1, X20

Connecting conductors without a screw driver[1]	Connecting conductors using a screw driver[2]
	
812406283	812407947

1) Single-wire conductors and flexible conductors with conductor end sleeves can be installed directly (without using a tool) up to two cross section sizes below the rated cross section.

2) When connecting untreated, flexible conductors or conductors with a small cross section that cannot be installed directly, firmly insert a screw driver into the activation opening to open the clamping spring.

Terminals X8 / X81 / X9 / X91 / X29 / X45 / X25 / X30 / X31 / X35[1]



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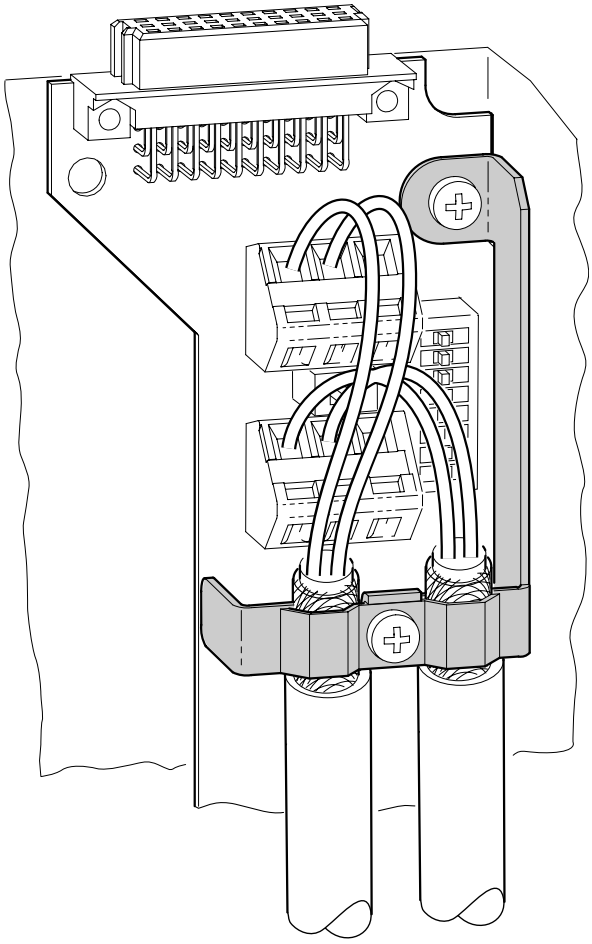
1) Always use a screw driver to connect these terminals, regardless of the conductor type.

Connection of the PROFIBUS cable in MOVIFIT®

Observe the following guidelines compiled by the PROFIBUS Nutzerorganisation e.V. (PROFIBUS user organization) when installing the PROFIBUS (on the Internet at www.profibus.com):

- "Installation guidelines for PROFIBUS DP/FMS", order number 2.111 (German) or 2.112 (English)
- "Installation recommendations for PROFIBUS", order number 8.021 (German) or 8.022 (English)

Apply the cable shield of the PROFIBUS cable as follows:

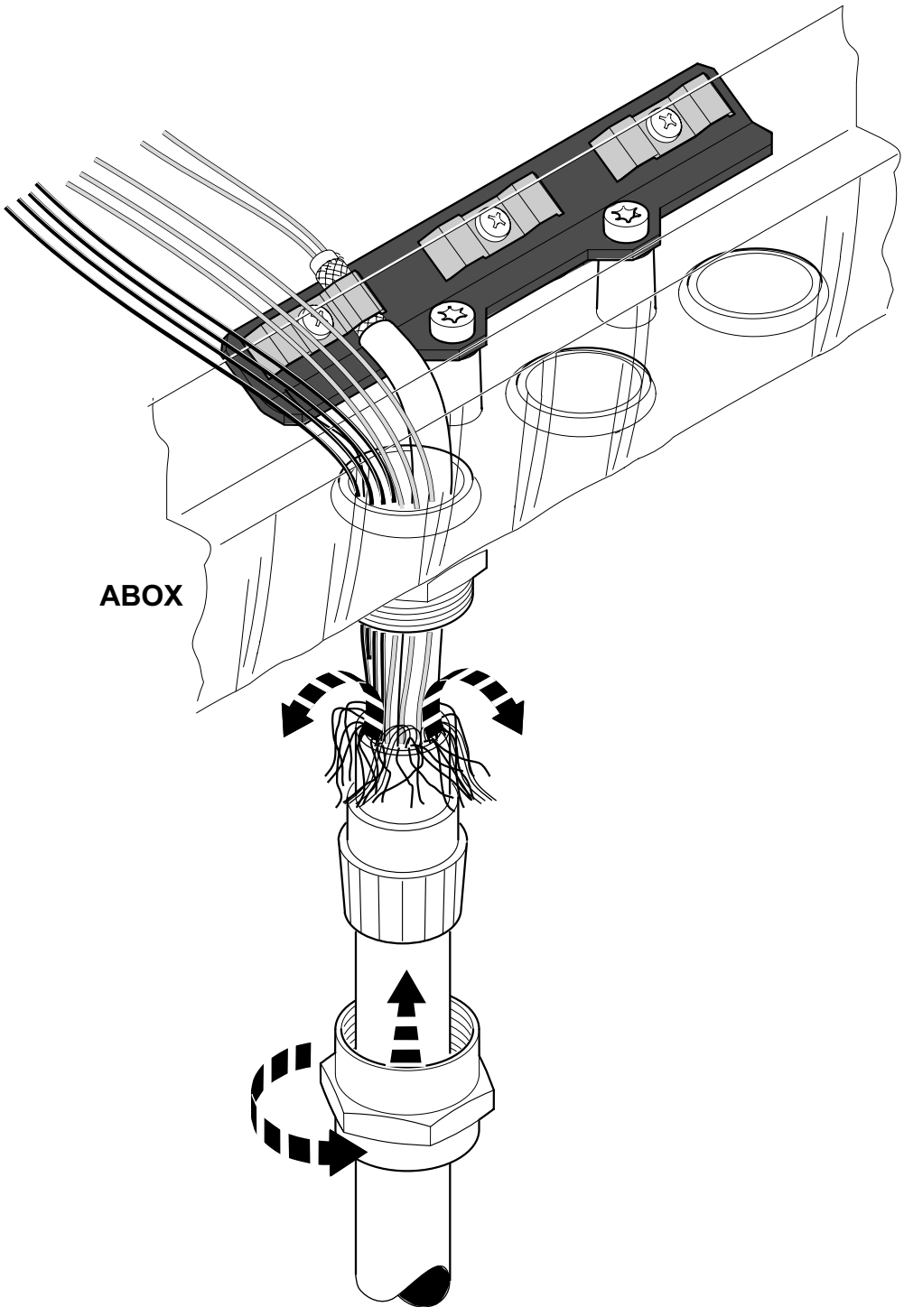


812446219

	TIPS
	• Note that the PROFIBUS connector cores inside the MOVIFIT® must be kept as short as possible and are always of equal length for the incoming and outgoing bus. • The PROFIBUS is not interrupted when you remove the EBOX (electronics unit) from the ABOX (connection unit).

Connecting the hybrid cable

- SEW-EURODRIVE recommends using the shielded and pre-fabricated SEW hybrid cables specifically designed for connecting MOVIFIT® and the motor; see the section "Hybrid cables" (see page 92).
- The outer shield of the hybrid cable must be attached to the housing of the unit using a suitable EMC cable gland.
- The inner shield of the hybrid cable must be connected across a shield plate in the MOVIFIT®-ABOX as follows:



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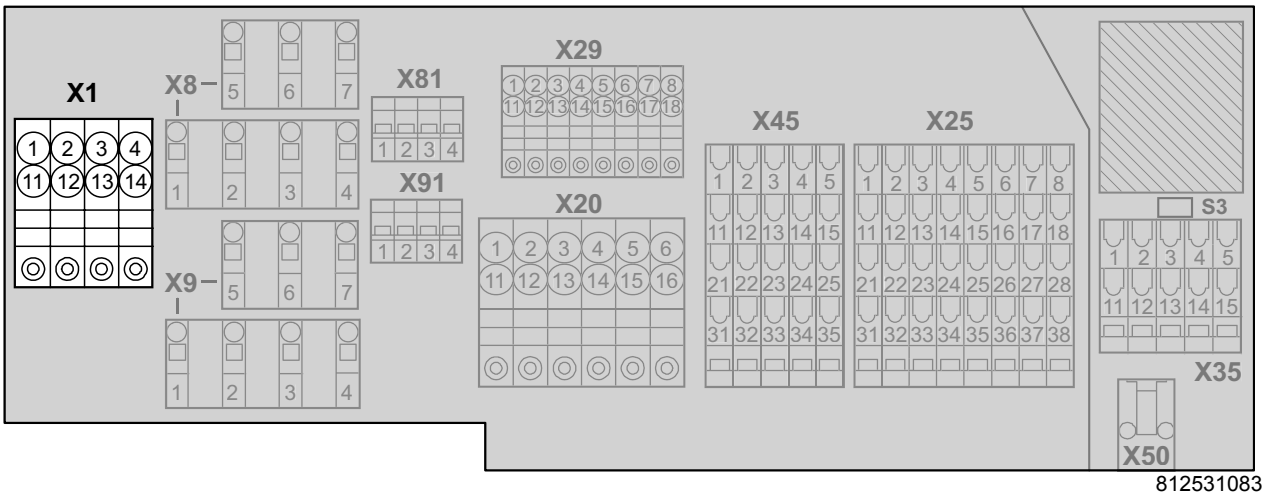
5.4.4 Fieldbus/option-independent terminal assignment

⚠ DANGER

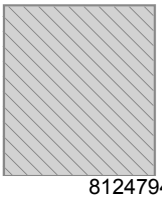
The maintenance switch only disconnects the integrated frequency inverter from the mains. Voltage is still present on the terminals of the MOVIFIT® unit.

Severe or fatal injuries from electric shock

- Switch off the power to the MOVIFIT® using a suitable external disconnecting device, and wait at least 1 minute before opening the wiring space.



812531083



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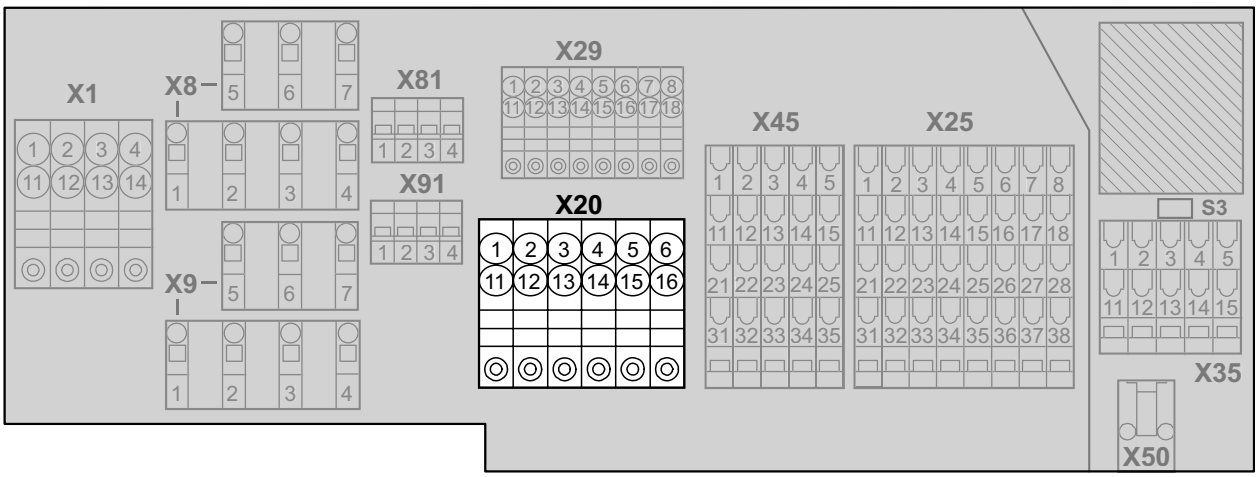
The terminal diagrams depicted in this section differ depending on the fieldbus system used. The area dependent on the fieldbus is therefore represented as hatched and is described in the following sections.

Mains terminal (power bus)			
No.		**Name**	**Function**
X1	**1**	PE	Mains connection PE (IN)
	2	L1	Mains connection phase L1 (IN)
	3	L2	Mains connection phase L2 (IN)
	4	L3	Mains connection phase L3 (IN)
	11	PE	Mains connection PE (OUT)
	12	L1	Mains connection phase L1 (OUT)
	13	L2	Mains connection phase L2 (OUT)
	14	L3	Mains connection phase L3 (OUT)



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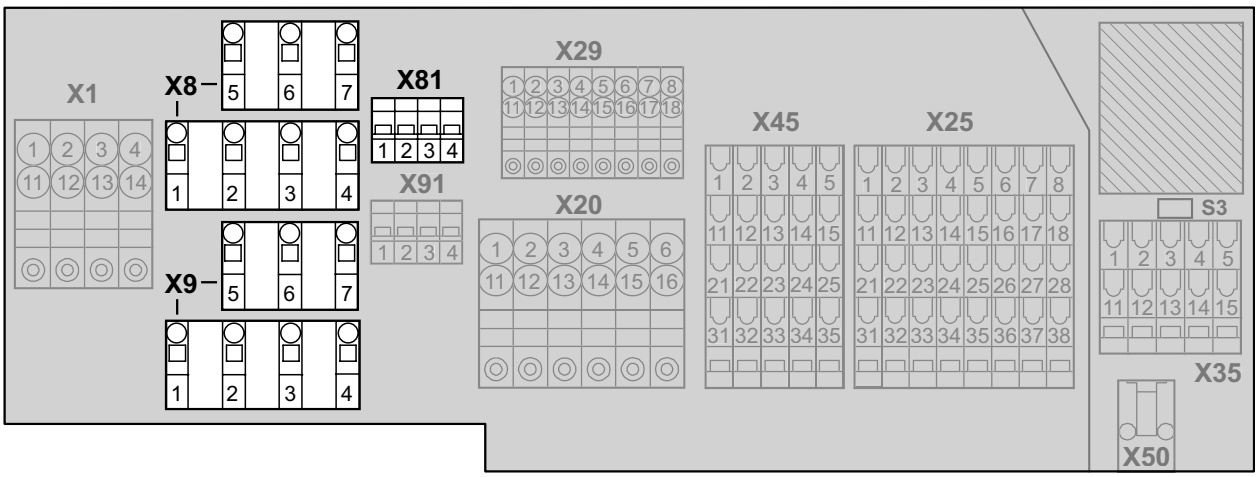
24 V supply terminal (24 V power bus)			
No.		**Name**	**Function**
X20	**1**	FE	Functional ground (IN)
	2	+24V_C	+24 V continuous voltage supply (IN)
	3	0V24_C	0V24 reference potential – continuous voltage (IN)
	4	FE	Functional ground (IN)
	5	+24V_S	+24 V supply – switched (IN)
	6	0V24_S	0V24 reference potential – switched (IN)
	11	FE	Functional ground (OUT)
	12	+24V_C	+24 V continuous voltage supply (OUT)
	13	0V24_C	0V24 reference potential – continuous voltage (OUT)
	14	FE	Functional ground (OUT)
	15	+24V_S	+24V supply – switched (OUT)
	16	0V24_S	0V24 reference potential – switched (OUT)



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Motor connection terminal (connection via hybrid cable)				
No.		**Name**	**Function of motor with SEW standard brake**	**Working motor with 2-wire, constant DC brake[1)]**
X8	**1**	PE	PE connection motor	
	2	U	Output motor phase U	
	3	V	Output motor phase V	
	4	W	Output motor phase W	
	5	15	Connection for SEW brake terminal 15 (blue)	DC brake connection (+)
	6	14	Connection for SEW brake terminal 14 (white)	No function
	7	13	Connection for SEW brake terminal 13 (red)	DC brake connection (–)
X81	**1**	TF+	Connection for temperature sensor TF/TH (+) motor	
	2	TF-	Connection for temperature sensor TF/TH (–) motor	
	3	DB00	Binary output "Brake released" = factory setting (control signal 24 V)	
	4	0V24_C	0V24 reference potential for brake output	
X9	**1**	PE	PE connection	
	2	-	Reserved	
	3	-	Reserved	
	4	-	Reserved	
	5	-R	Braking resistor connection "–R"	
	6	-	Reserved	
	7	+R	Braking resistor connection "+R"	
X91	**1-4**	-	Reserved	

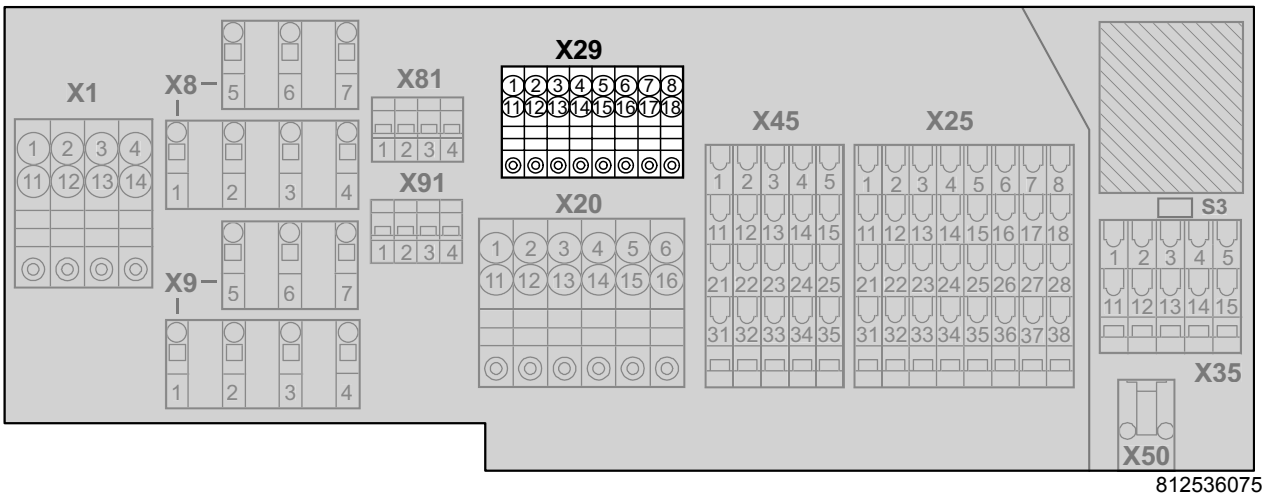
1) Before starting up a MOVIFIT®-FC drive that uses a constant DC brake, you must connect an additional, external braking resistor to the MOVIFIT®-FC inverter. The braking resistor is used to dissipate the regenerative energy.

⚠ DANGER

If you use binary output DB00 to control the brake, do not change the parameters of the binary output functions.

Severe or fatal injuries

- Before using the binary output for controlling the brake, check the parameter settings.



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24 V distributor terminal (for distributing the supply voltage(s) to the integrated frequency inverter and option card)			
No.		**Name**	**Function**
X29	**1**	+24V_C	+24 V supply for binary inputs – continuous voltage (jumpered with X20/2)
	2	0V24_C	0V24 reference potential for binary inputs – continuous voltage (jumpered with X20/3)
	3	+24V_S	+24 V supply for binary outputs – switched (jumpered with X20/5)
	4	0V24_S	0V24 reference potential for binary outputs – switched (jumpered with X20/6)
	5	+24V_P	+24 V supply for integrated frequency inverter (IN)
	6	0V24_P	0V24 reference potential for integrated frequency inverter (IN)
	7	+24V_O	+24 V supply for option card, supply
	8	0V24_O	0V24 reference potential for option card, supply
	11	+24V_C	+24 V supply for binary inputs – continuous voltage (jumpered with X20/2)
	12	0V24_C	0V24 reference potential for binary inputs – continuous voltage (jumpered with X20/3)
	13	+24V_S	+24 V supply for binary outputs – switched (jumpered with X20/5)
	14	0V24_S	0V24 reference potential for binary outputs – switched (jumpered with X20/6)
	15	+24V_P	+24 V supply for integrated frequency inverter (OUT)
	16	0V24_P	0V24 reference potential for integrated frequency inverter (OUT)
	17	+24V_O	+24 V supply for option card, supply
	18	0V24_O	0V24 reference potential for option card, supply

TIPS

- The terminal assignment "X29" illustrated here applies as of status 11 of the wiring circuit board. If you use a wiring circuit board with another status, consult SEW-EURODRIVE.
- The status of the wiring circuit board is indicated in the first status field of the ABOX nameplate:

  Status: 11 11 -- 10 -- 10 10 -- --

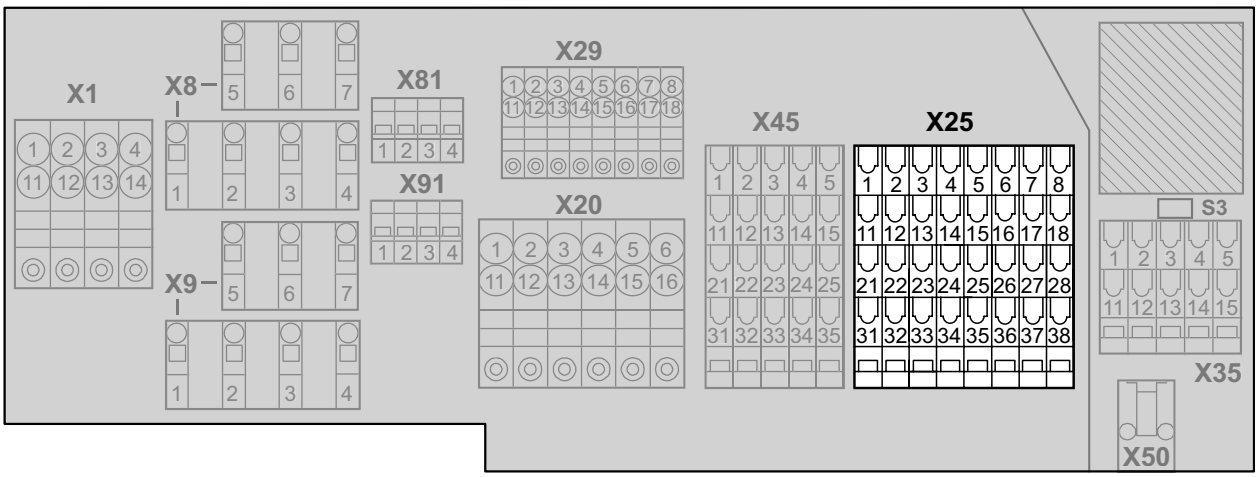
  Status of the wiring board
- You can find an example of a nameplate in section "Sample ABOX type code".

⚠ DANGER

When you use terminals X29/5, X29/6, X29/15, and X29/16 for a safe disconnection, you must observe the SEW publication "Safe Disconnection for MOVIFIT®".

Severe or fatal injuries

- Observe the permissible wiring diagrams and safety conditions in the SEW publication "Safe Disconnection for MOVIFIT®".



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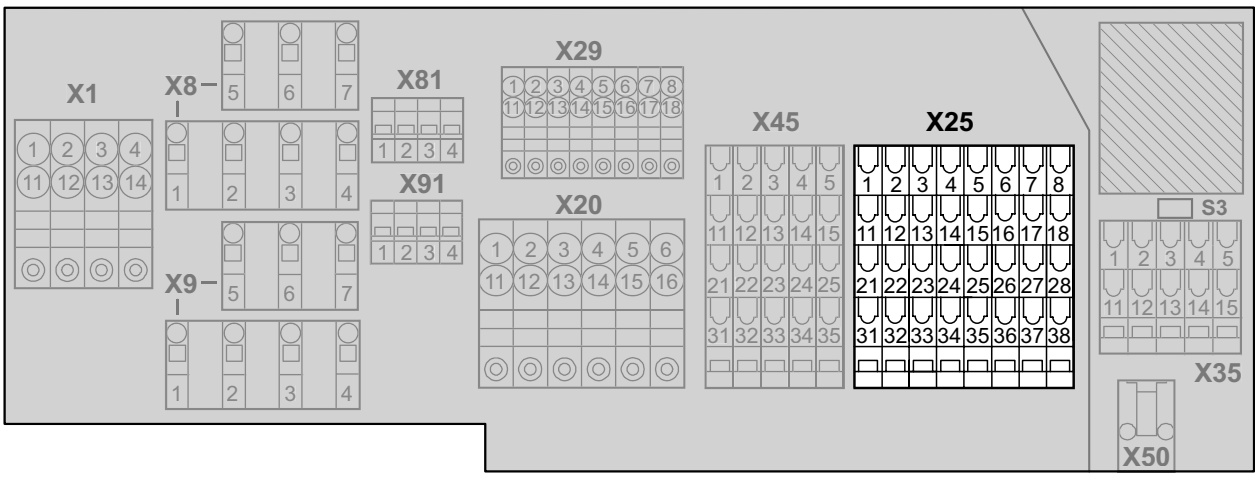
I/O terminal (connection of sensors + actuators)					
No.		**Function level "System" with PROFIBUS** **Function level "Technology" with PROFIBUS, DeviceNet, PROFINET, EtherNet/IP, or Modbus/TCP** **Function level "Classic" with PROFINET**		**Function level "Classic" with PROFIBUS or DeviceNet**	
		Name	**Function**	**Name**	**Function**
X25	**1**	DI00	Binary input DI00 (switching signal)	DI00	Binary input DI00 (switching signal)
	2	DI02	Binary input DI02 (switching signal)	DI01	Binary input DI01 (switching signal)
	3	DI04	Binary input DI04 (switching signal) Encoder 1 connection, track A	DI02	Binary input DI02 (switching signal)
	4	DI06	Binary input DI06 (switching signal) Encoder 2 connection, track A	DI03	Binary input DI03 (switching signal)
	5	DI08	Binary input DI08 (switching signal) Encoder 3 connection, track A	DI04	Binary input DI04 (switching signal)
	6	DI10	Binary input DI10 (switching signal)	DI05	Binary input DI05 (switching signal)
	7	DI12/DO00	Binary input DI12 or binary output DO00 (switching signal)	DI06/DO00	Binary input DI06 or binary output DO00 (switching signal)
	8	DI14/DO02	Binary input DI14 or binary output DO02 (switching signal)	DI07/DO01	Binary input DI07 or binary output DO01 (switching signal)
	11	DI01	Binary input DI01 (switching signal)	**Terminals X25/11 to X25/18 are reserved with function level "Classic" (PROFIBUS or DeviceNet).**	
	12	DI03	Binary input DI03 (switching signal)		
	13	DI05	Binary input DI05 (switching signal) Encoder 1 connection, track B		
	14	DI07	Binary input DI07 (switching signal) Encoder 2 connection, track B		
	15	DI09	Binary input DI09 (switching signal) Encoder 3 connection, track B		
	16	DI11	Binary input DI11 (switching signal)		
	17	DI13/DO01	Binary input DI13 or binary output DO01 (switching signal)		
	18	DI15/DO03	Binary input DI15 or binary output DO03 (switching signal)		



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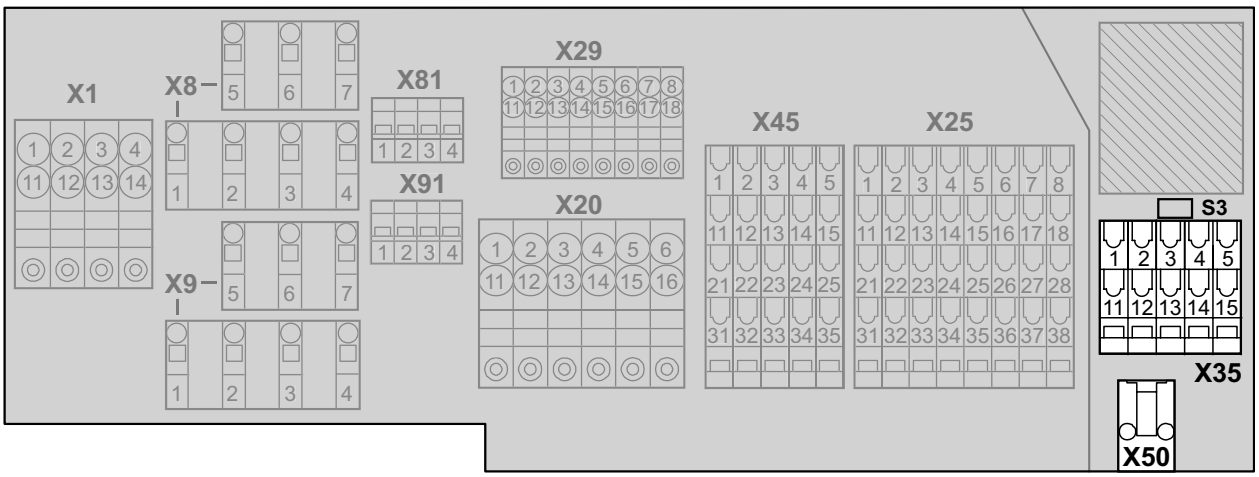
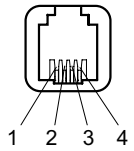
I/O terminal (connection of sensors + actuators)				
No.		**Function level "System" with PROFIBUS** **Function level "Technology" with PROFIBUS, DeviceNet, PROFINET, EtherNet/IP, or Modbus/TCP** **Function level "Classic" with PROFINET**		**Function level "Classic" with PROFIBUS or DeviceNet**
		Name	**Function**	**Function**
X25	**21**	VO24-I	+24 V sensor supply, group I (DI00 - DI03), from +24V_C	+24 V sensor supply, group I (DI00 - DI01), from +24V_C
	22	VO24-I	+24 V sensor supply, group I (DI00 - DI03), from +24V_C	+24 V sensor supply, group I (DI00 - DI01), from +24V_C
	23	VO24-II	+24 V sensor supply, group II (DI04 - DI07), from +24V_C	+24 V sensor supply, group II (DI02 - DI03), from +24V_C
	24	VO24-II	+24 V sensor supply, group II (DI04 - DI07), from +24V_C	+24 V sensor supply, group II (DI02 - DI03), from +24V_C
	25	VO24-III	+24 V sensor supply, group III (DI08 - DI11), from +24V_C	+24 V sensor supply, group III (DI04 - DI05), from +24V_C
	26	VO24-III	+24 V sensor supply, group III (DI08 - DI11), from +24V_C	+24 V sensor supply, group III (DI04 - DI05), from +24V_C
	27	VO24-IV	+24 V sensor supply, group IV (DI12 - DI15), from +24V_S	+24 V sensor supply, group IV (DI06 - DI07), from +24V_S
	28	VO24-IV	+24 V sensor supply, group IV (DI12 - DI15), from +24V_S	+24 V sensor supply, group IV (DI06 - DI07), from +24V_S
	31	0V24_C	0V24 reference potential for sensors	
	32	0V24_C	0V24 reference potential for sensors	
	33	0V24_C	0V24 reference potential for sensors	
	34	0V24_C	0V24 reference potential for sensors	
	35	0V24_C	0V24 reference potential for sensors	
	36	0V24_C	0V24 reference potential for sensors	
	37	0V24_S	0V24 reference potential for actuators or sensors, group IV	
	38	0V24_S	0V24 reference potential for actuators or sensors, group IV	



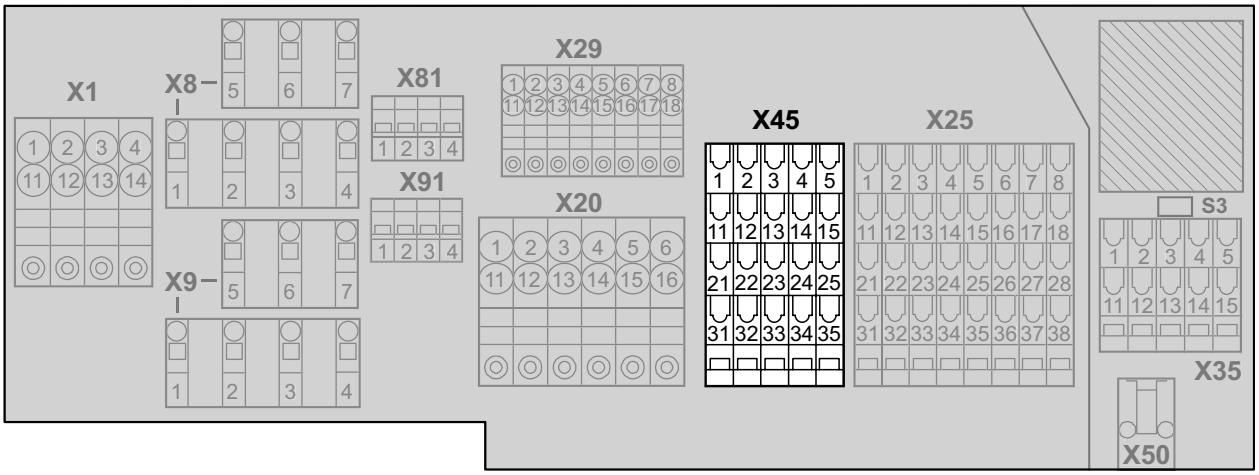
SBus terminal (CAN)			
X35[1]	**1**	CAN_GND	0 V reference potential for SBus (CAN)
	2	CAN_H	SBus CAN_H – incoming
	3	CAN_L	SBus CAN_L – incoming
	4	+24V_C_PS	+24 V supply – continuous voltage for peripheral devices
	5	0V24_C	0V24 reference potential – continuous voltage for peripheral devices (jumpered with X20/3)
	11	CAN_GND	0 V reference potential for SBus (CAN)
	12	CAN_H	SBus CAN_H – outgoing
	13	CAN_L	SBus CAN_L – outgoing
	14	+24V_C_PS	+24 V supply – continuous voltage for peripheral devices
	15	0V24_C	0V24 reference potential – continuous voltage for peripheral devices (jumpered with X20/3)

1) X35 terminals can only be used with function levels "Technology" or "System".

Diagnostics (RJ10 socket)			
No.		**Name**	**Function**
X50 	**1**	+5 V	5 V supply
	2	RS+	RS485 diagnostics interface
	3	RS–	RS485 diagnostics interface
	4	0V5	0 V reference potential for RS485

5.4.5 Option-dependent terminal assignment

I/O terminal X45 in conjunction with PROFIsafe option card S11



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I/O terminal in conjunction with option card S11			
No.		**Name**	**Function**
X45	**1**	F-DI00	Safety-related binary input F-DI00 (switching signal)
	2	F-DI02	Safety-related binary input F-DI02 (switching signal)
	3	F-DO00_P	Safety-related binary output F-DO00 (P switching signal)
	4	F-DO01_P	Safety-related binary output F-DO01 (P switching signal)
	5	F-DO_STO_P	Safety-related binary output F-DO_STO (P switching signal) for safe disconnection of the drive (STO)
	11	F-DI01	Safety-related binary input F-DI01 (switching signal)
	12	F-DI03	Safety-related binary input F-DI03 (switching signal)
	13	F-DO00_M	Safety-related binary output F-DO00 (M switching signal)
	14	F-DO01_M	Safety-related binary output F-DO01 (M switching signal)
	15	F-DO_STO_M	Safety-related binary output F-DO_STO (M switching signal) for safe disconnection of the drive (STO)
	21	F-SS0	+24 V sensor supply for failsafe inputs F-DI00 and F-DI02
	22	F-SS0	+24 V sensor supply for failsafe inputs F-DI00 and F-DI02
	23	F-SS1	+24 V sensor supply for failsafe inputs F-DI01 and F-DI03
	24	F-SS1	+24 V sensor supply for failsafe inputs F-DI01 and F-DI03
	25	F-SS1	+24 V sensor supply for failsafe inputs F-DI01 and F-DI03
	31	0V24_O	0V24 reference potential for failsafe inputs/outputs
	32	0V24_O	0V24 reference potential for failsafe inputs/outputs
	33	0V24_O	0V24 reference potential for failsafe inputs/outputs
	34	0V24_O	0V24 reference potential for failsafe inputs/outputs
	35	0V24_O	0V24 reference potential for failsafe inputs/outputs

⚠ DANGER

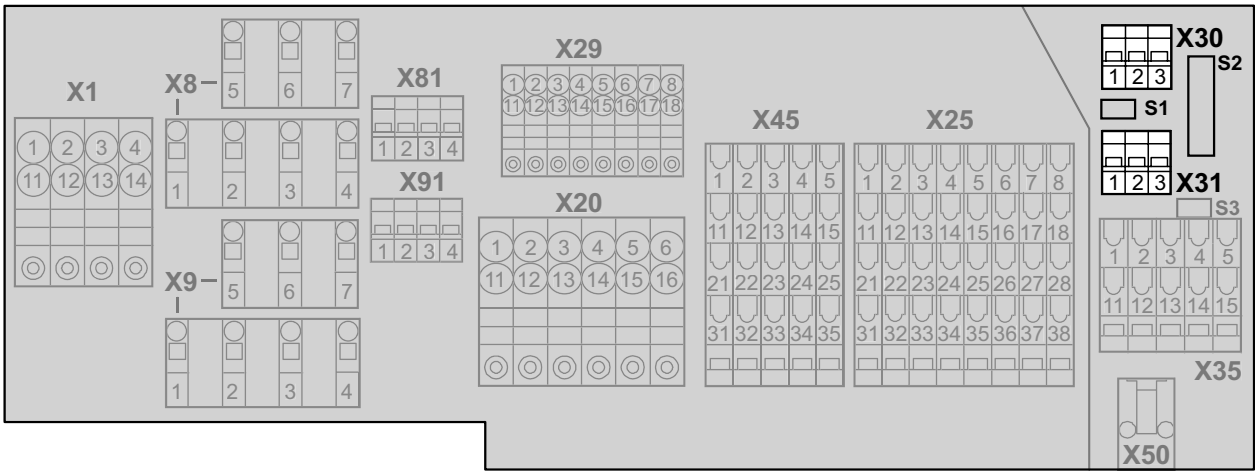
When installing and using terminal X45, you must observe the SEW publication "Safe Disconnection for MOVIFIT®".

Severe or fatal injuries

- When using PROFIsafe option S11, observe the permissible wiring diagrams and safety conditions in the SEW publication "Safe Disconnection for MOVIFIT®".

5.4.6 Fieldbus-dependent terminal/pin assignment

PROFIBUS terminal assignment



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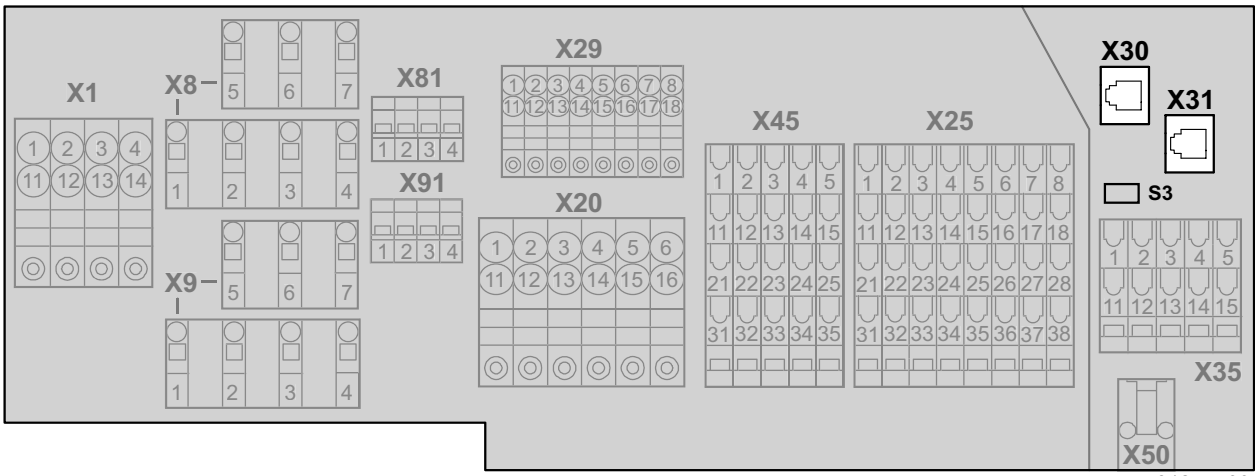
PROFIBUS terminal			
No.		**Name**	**Function**
X30	**1**	A_IN	PROFIBUS line A – incoming
	2	B_IN	PROFIBUS line B – incoming
	3	0V5_PB	0V5 reference potential for PROFIBUS (for measuring purposes only)
X31	**1**	A_OUT	PROFIBUS line A – outgoing
	2	B_OUT	PROFIBUS line B – outgoing
	3	+5V_PB	+5 V output PROFIBUS (for measuring purposes only)

Pin assignment for EtherNet/IP, PROFINET, and Modbus/TCP



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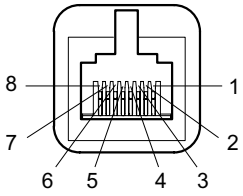
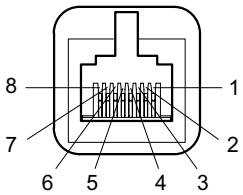
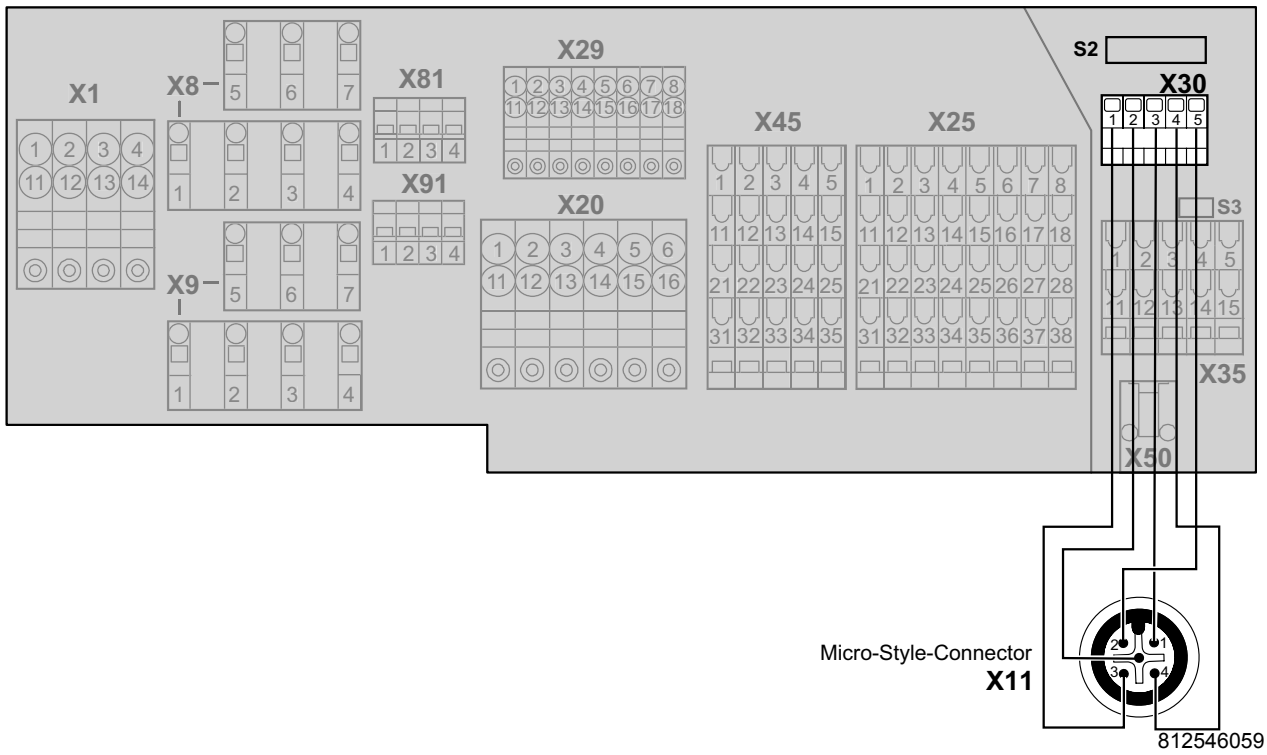
EtherNet/IP, PROFINET and Modbus/TCP connection (RJ45 socket)				
No.		**Name**	**Function**	
X30 	**1**	TX+	Transmit line port 1 positive	Ethernet port 1
	2	TX–	Transmit line port 1 negative	
	3	RX+	Receive line port 1 positive	
	4	Res.	On 75 ohm lead	
	5	Res.	On 75 ohm lead	
	6	RX–	Receive line port 1 negative	
	7	Res.	On 75 ohm lead	
	8	Res.	On 75 ohm lead	
X31 	**1**	TX+	Transmit line port 2 positive	Ethernet port 2
	2	TX–	Transmit line port 2 negative	
	3	RX+	Receive cable port 2 positive	
	4	Res.	On 75 ohm lead	
	5	Res.	On 75 ohm lead	
	6	RX–	Receive line port 2 negative	
	7	Res.	On 75 ohm lead	
	8	Res.	On 75 ohm lead	

DeviceNet terminal/pin assignment



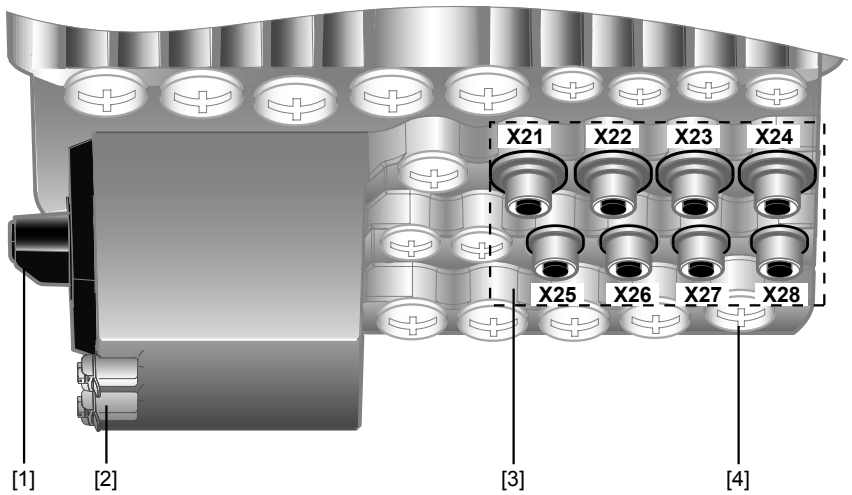
DeviceNet					
Pin no.	**X11**	**X30**	**Name**	**Function**	**Color coding**
Micro-style connector (standard coding)	**1**	**3**	DRAIN	Equipotential bonding	Blue
	2	**5**	V+	DeviceNet voltage supply +24 V	Gray
	3	**1**	V–	DeviceNet reference potential 0V24	Brown
	4	**4**	CAND_H	CAN_H data line	Black
	5	**2**	CAND_L	CAN_L data line	White

5.5 Hybrid ABOX "MTA...-S42.-...-00"

	TIP
	• The hybrid ABOX is based on the standard ABOX "MTA...-S02.-...-00". Therefore, the following describes only the additional plug connectors in comparison with the standard ABOX. • For a description of the terminals, refer to section "Standard ABOX "MTA...-S02.-...00" (see page 43). • Customers cannot use terminal strip X25 because the described plug connectors are assigned to it.

5.5.1 Description

The following figure depicts the hybrid ABOX with M12 plug connectors for connecting digital I/Os:



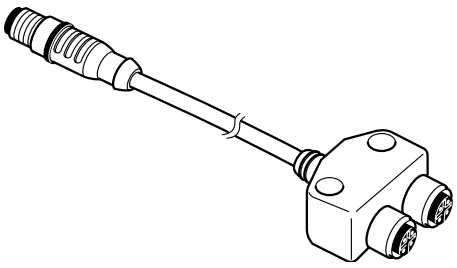
915287947

[1] Maintenance switch (option)
[2] PE connection
[3] M12 plug connector for I/Os
[4] Diagnostics socket (RJ10) under the screw connection

Y adapter

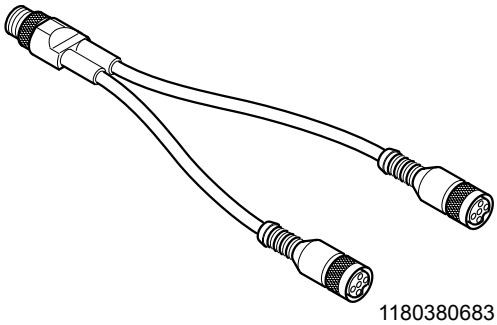
Use a Y adapter with an extension for connecting two sensors/actuators to an M12 plug connector.

The Y adapter is available from various manufacturers:


915294347

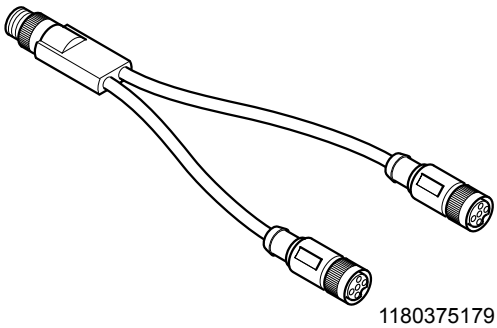
Manufacturer: Escha

Type: WAS4-0,3-2FKM3/..


1180380683

Manufacturer: Binder

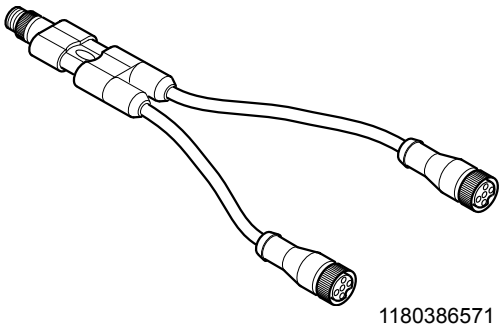
Type: 79 5200 ..


1180375179

Manufacturer: Phoenix Contact

Type: SAC-3P-Y-2XFS SCO/.../...

The cable sheath is made out of PVC. Make sure to use appropriate UV protection.


1180386571

Manufacturer: Murr

Type: 7000-40721-..

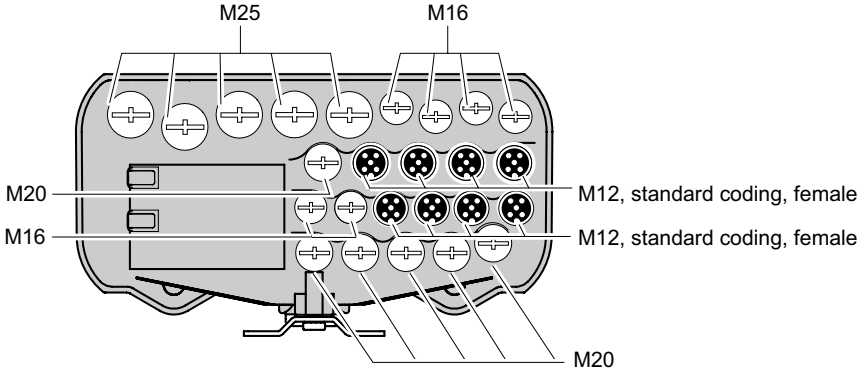
5.5.2 Variants

The following variants of the hybrid ABOX are available for MOVIFIT®-FC (MTF):

- MTA11A-503-S4**2**.-...-00:
  - Optional external braking resistor
  - Optional integrated braking resistor
  - Optional switch disconnector

The following figure shows the screw connections and plug connectors of the hybrid ABOX:

PROFIBUS	MTA11A-503-S4.**1**-...-00
PROFINET	MTA11A-503-S4.**3**-...-00
EtherNet/IP	MTA11A-503-S4.**3**-...-00
Modbus/TCP	MTA11A-503-S4.**3**-...-00



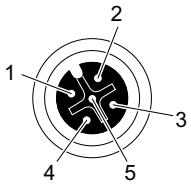
915317771

5.5.3 I/O pin assignment (X21-X28)

I/Os

12 DI + 4 DI/O

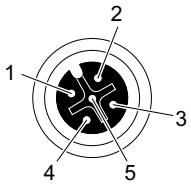
M12 plug connector, standard coding, female



Pin	X21	X22	X23 (Encoder 1 connection)	X24 (Encoder 2 connection)
1	VO24-I	VO24-I	VO24-II	VO24-II
2	DI01	DI03	DI05 Encoder track B	DI07 Encoder track B
3	0V24_C	0V24_C	0V24_C	0V24_C
4	DI00	DI02	DI04 Encoder track A	DI06 Encoder track A
5	n.c.	n.c.	n.c.	n.c.
Pin	**X25 (Encoder 3 connection)**	**X26**	**X27**	**X28**
1	VO24-III	VO24-III	VO24-IV	VO24-IV
2	DI09 Encoder track B	DI11	DI13/DO01	DI15/DO03
3	0V24_C	0V24_C	0V24_S	0V24_S
4	DI08 Encoder track A	DI10	DI12/DO00	DI14/DO02
5	n.c.	n.c.	n.c.	n.c.

6 DI + 2 DI/O

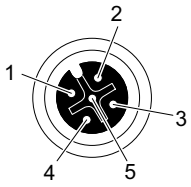
M12 plug connector, standard coding, female



Pin	X21	X22	X23	X24
1	VO24-I	VO24-I	VO24-II	VO24-II
2	Res.	Res.	Res.	Res.
3	0V24_C	0V24_C	0V24_C	0V24_C
4	DI00	DI01	DI02	DI03
5	n.c.	n.c.	n.c.	n.c.
Pin	**X25**	**X26**	**X27**	**X28**
1	VO24-III	VO24-III	VO24-IV	VO24-IV
2	Res.	Res.	Res.	Res.
3	0V24_C	0V24_C	0V24_S	0V24_S
4	DI04	DI05	DI06/DO00	DI07/DO01
5	n.c.	n.c.	n.c.	n.c.

4 DI

M12 plug connector, standard coding, female



Pin	X21	X22	X23 - X28
1	VO24	VO24	Res.
2	DI101	DI103	Res.
3	0V24_C	0V24_C	Res.
4	DI100	DI102	Res.
5	n.c.	n.c.	Res.

12 DI + 4 DI/O	MOVIFIT® versions with 12 DI + 4 DI/O	
	Function level	**Fieldbus**
	Technology or System	All
	Classic	PROFINET, EtherNet/IP, Modbus/TCP

6 DI + 2 DI/O	MOVIFIT® versions with 6 DI + 2 DI/O	
	Function level	**Fieldbus**
	Classic	PROFIBUS or DeviceNet

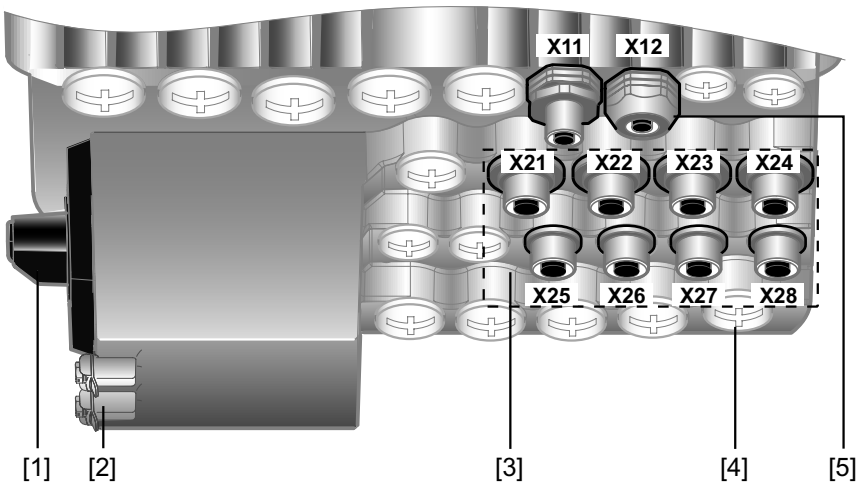
4 DI	MOVIFIT® versions with 4 DI	
	Function level	**Fieldbus**
	None	SBus slave

5.6 Hybrid ABOX "MTA...-S52.-...-00"

	TIP
	• The hybrid ABOX is based on the standard ABOX "MTA...-S02.-...-00". Therefore, the following describes only the additional plug connectors in comparison with the standard ABOX. • For a description of the terminals, refer to section "Standard ABOX "MTA...-S02.-...-00"" (see page 43). • Customers cannot use terminal strips X25, X30, or X31 because the described plug connectors are assigned to them.

5.6.1 Description

The following figure depicts the hybrid ABOX with M12 plug connectors for connecting I/Os and bus:



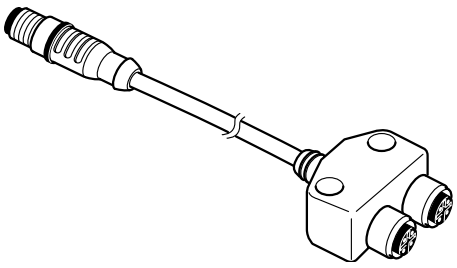
934768139

[1] Maintenance switch (option)
[2] PE connection
[3] M12 plug connector for I/Os
[4] Diagnostics socket (RJ10) under the screw connection
[5] M12 plug connector for the fieldbus connection

Y adapter

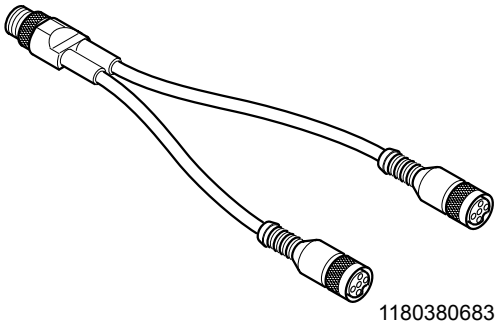
Use a Y adapter with an extension for connecting two sensors/actuators to an M12 plug connector.

The Y adapter is available from various manufacturers:


915294347

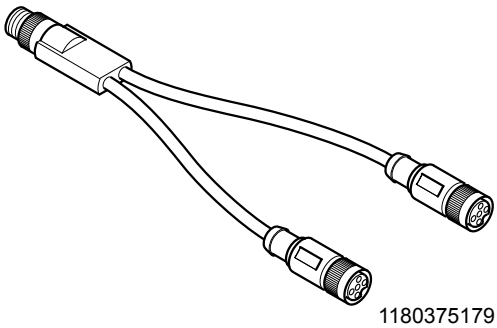
Manufacturer: Escha

Type: WAS4-0,3-2FKM3/..


1180380683

Manufacturer: Binder

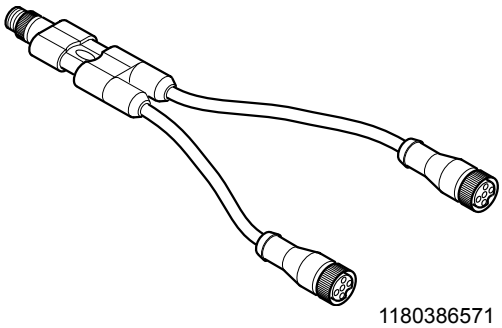
Type: 79 5200 ..


1180375179

Manufacturer: Phoenix Contact

Type: SAC-3P-Y-2XFS SCO/.../...

The cable sheath is made out of PVC. Make sure to use appropriate UV protection.


1180386571

Manufacturer: Murr

Type: 7000-40721-..

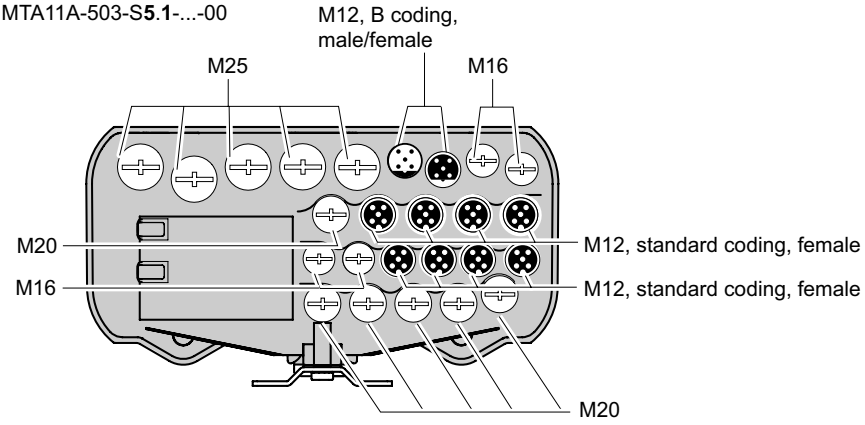
5.6.2 Variants

The following variants of the hybrid ABOX are available for MOVIFIT®-FC (MTF):

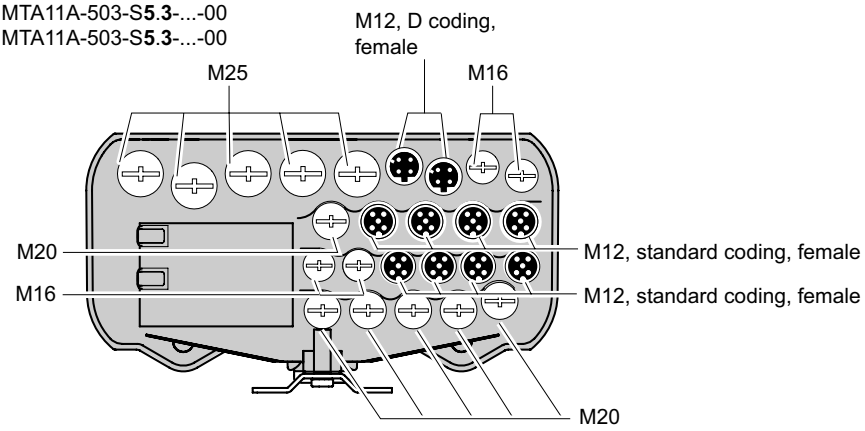
- MTA11A-503-S5**2**.-...-00:
  - Optional external braking resistor
  - Optional integrated braking resistor
  - Optional switch disconnector

The following figure shows the screw connections and plug connectors of the hybrid ABOX depending on the fieldbus interface:

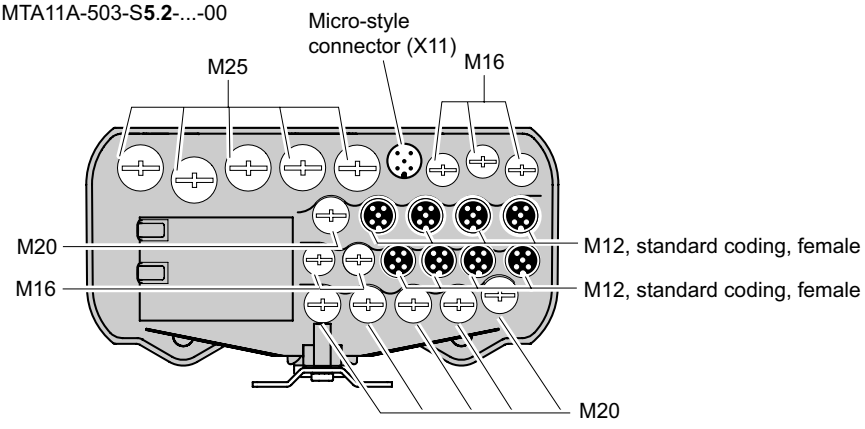
PROFIBUS MTA11A-503-S**5.1**-...-00



PROFINET MTA11A-503-S**5.3**-...-00
EtherNet/IP MTA11A-503-S**5.3**-...-00
Modbus/TCP MTA11A-503-S**5.3**-...-00



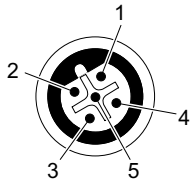
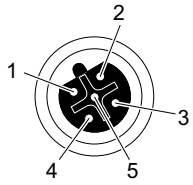
DeviceNet MTA11A-503-S**5.2**-...-00



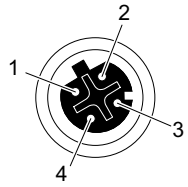
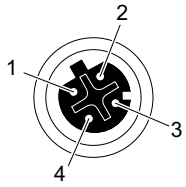
915682827

5.6.3 Pin assignment of fieldbus interface (X11/X12)

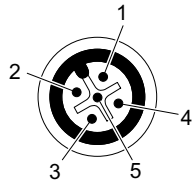
PROFIBUS

X11 (PROFIBUS IN)	Pin	Assignment	X12 (PROFIBUS OUT)	Pin	Assignment
M12 plug connector, B coding, male 	1	n.c.	M12 plug connector, B coding, female 	1	+5V_PB
	2	A_IN		2	A_OUT
	3	n.c.		3	0V5_PB
	4	B_IN		4	B_OUT
	5	n.c.		5	n.c.

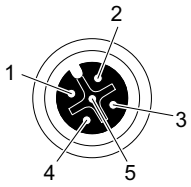
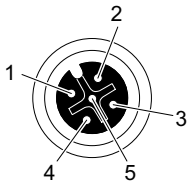
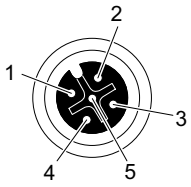
Ethernet (PROFINET, EtherNet/IP, or Modbus/TCP)

X11 (Port1)	Pin	Assignment	X12 (Port2)	Pin	Assignment
M12 plug connector, D coding, female 	1	TX+	M12 plug connector, D coding, female 	1	TX+
	2	RX+		2	RX+
	3	TX–		3	TX–
	4	RX–		4	RX–

DeviceNet

X11	Pin	Assignment
Micro-style connector, standard coding, male 	1	DRAIN
	2	V+
	3	V–
	4	CAND_H
	5	CAND_L

5.6.4 I/O pin assignment (X21-X28)

I/Os					
12 DI + 4 DI/O	**Pin**	**X21**	**X22**	**X23 (Encoder 1 connection)**	**X24 (Encoder 2 connection)**
M12 plug connector, standard coding, female 	**1**	VO24-I	VO24-I	VO24-II	VO24-II
	2	DI01	DI03	DI05 Encoder track B	DI07 Encoder track B
	3	0V24_C	0V24_C	0V24_C	0V24_C
	4	DI00	DI02	DI04 Encoder track A	DI06 Encoder track A
	5	n.c.	n.c.	n.c.	n.c.
	Pin	**X25 (Encoder 3 connection)**	**X26**	**X27**	**X28**
	1	VO24-III	VO24-III	VO24-IV	VO24-IV
	2	DI09 Encoder track B	DI11	DI13/DO01	DI15/DO03
	3	0V24_C	0V24_C	0V24_S	0V24_S
	4	DI08 Encoder track A	DI10	DI12/DO00	DI14/DO02
	5	n.c.	n.c.	n.c.	n.c.
6 DI + 2 DI/O	**Pin**	**X21**	**X22**	**X23**	**X24**
M12 plug connector, standard coding, female 	**1**	VO24-I	VO24-I	VO24-II	VO24-II
	2	Res.	Res.	Res.	Res.
	3	0V24_C	0V24_C	0V24_C	0V24_C
	4	DI00	DI01	DI02	DI03
	5	n.c.	n.c.	n.c.	n.c.
	Pin	**X25**	**X26**	**X27**	**X28**
	1	VO24-III	VO24-III	VO24-IV	VO24-IV
	2	Res.	Res.	Res.	Res.
	3	0V24_C	0V24_C	0V24_S	0V24_S
	4	DI04	DI05	DI06/DO00	DI07/DO01
	5	n.c.	n.c.	n.c.	n.c.
4 DI	**Pin**	**X21**	**X22**	**X23 - X28**	
M12 plug connector, standard coding, female 	**1**	VO24	VO24	Res.	
	2	DI101	DI103	Res.	
	3	0V24_C	0V24_C	Res.	
	4	DI100	DI102	Res.	
	5	n.c.	n.c.	Res.	

12 DI + 4 DI/O	MOVIFIT® versions with 12 DI + 4 DI/O	
	Function level	**Fieldbus**
	Technology or System	All
	Classic	PROFINET, EtherNet/IP, Modbus/TCP

6 DI + 2 DI/O	MOVIFIT® versions with 6 DI + 2 DI/O	
	Function level	**Fieldbus**
	Classic	PROFIBUS or DeviceNet

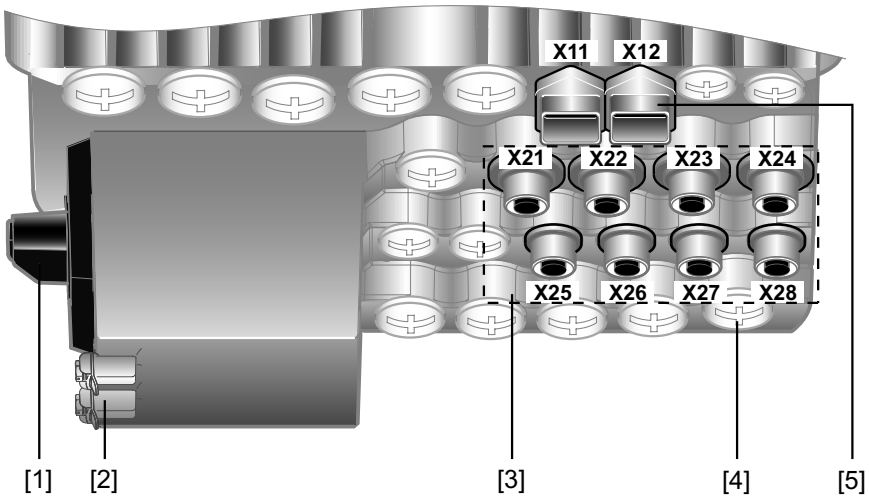
4 DI	MOVIFIT® versions with 4 DI	
	Function level	**Fieldbus**
	None	SBus slave

5.7 Hybrid ABOX "MTA...-S62.-...-00"

	TIP
	• The hybrid ABOX is based on the standard ABOX "MTA...-S02.-...-00". Therefore, the following describes only the additional plug connectors in comparison with the standard ABOX. • For a description of the terminals, refer to section "Standard ABOX "MTA...-S02.-...00"" (see page 43). • Customers cannot use terminal strips X25, X30, or X31 because the described plug connectors are assigned to them.

5.7.1 Description

The following figure shows the hybrid ABOX with M12 plug connectors for connecting I/Os and push-pull RJ45 plug connector for Ethernet connection:

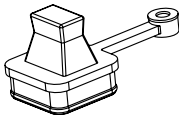


915673995

[1] Maintenance switch (integrated as standard in connection with MOVIFIT®-MC)
[2] PE connection
[3] M12 plug connector for I/Os
[4] Diagnostics socket (RJ10) under the screw connection
[5] Push-pull RJ45 plug connector for Ethernet connection

	NOTICE
	According to IEC PAS 61076-3-117, push-pull RJ45 sockets may only be used with the appropriate push-pull RJ45 mating connector. Commercially available RJ45 patch cables without push-pull connector housings do not lock into the connectors. Such cables can damage the sockets and are, therefore, not suitable.

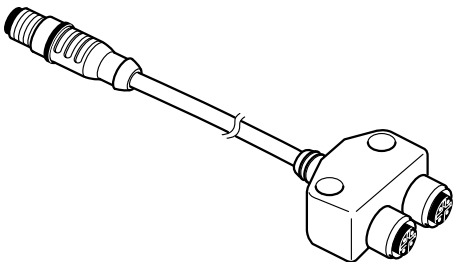
Closing plug, optional

Type	Figure	Contents	Part number
Ethernet closing plug for push-pull RJ45 socket		10 pieces	1822 370 2
		30 pieces	1822 371 0

Y adapter

Use a Y adapter with an extension for connecting two sensors/actuators to an M12 plug connector.

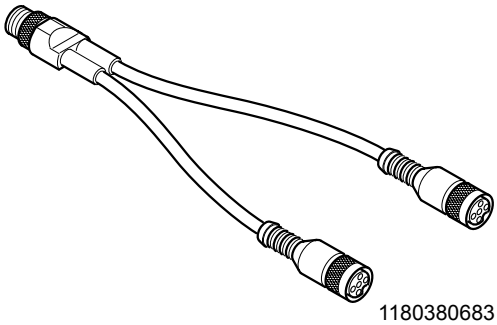
The Y adapter is available from various manufacturers:



915294347

Manufacturer: Escha

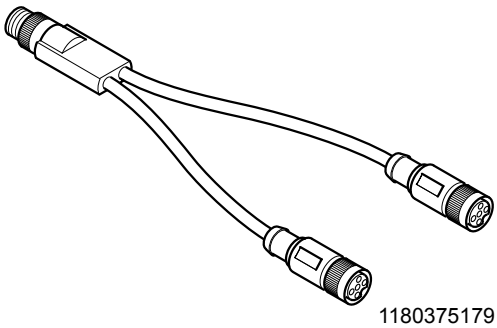
Type: WAS4-0,3-2FKM3/..



1180380683

Manufacturer: Binder

Type: 79 5200 ..

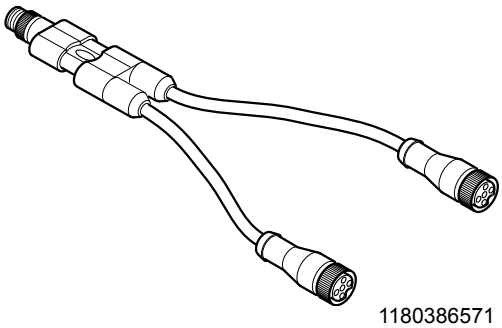


1180375179

Manufacturer: Phoenix Contact

Type: SAC-3P-Y-2XFS SCO/.../...

The cable sheath is made out of PVC. Make sure to use appropriate UV protection.



1180386571

Manufacturer: Murr

Type: 7000-40721-..

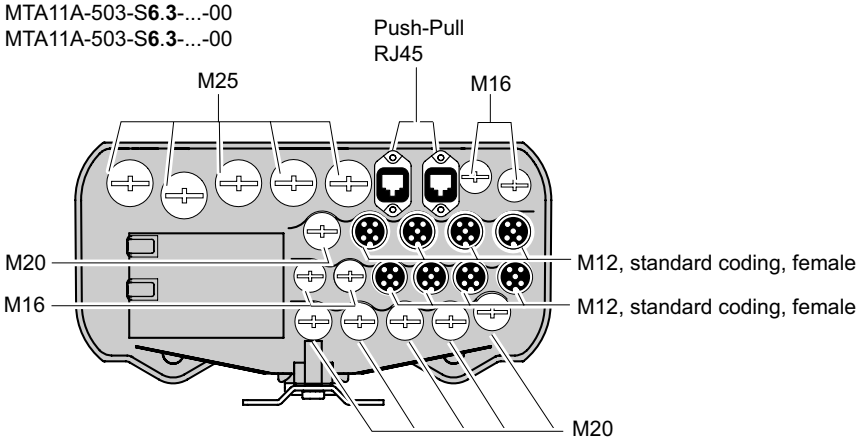
5.7.2 Variants

The following variants of the hybrid ABOX are available for MOVIFIT®-FC (MTF):

- MTA11A-503-S6**2**.-...-00:
  - Optional external braking resistor
  - Optional integrated braking resistor
  - Optional switch disconnector

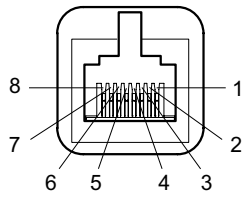
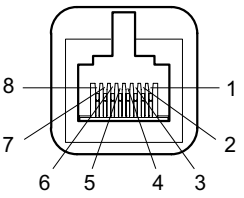
The following figure shows the screw connections and plug connectors of the hybrid ABOX:

PROFINET MTA11A-503-S**6.3**-...-00
EtherNet/IP MTA11A-503-S**6.3**-...-00
Modbus/TCP MTA11A-503-S**6.3**-...-00



934776075

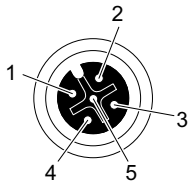
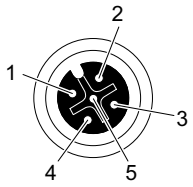
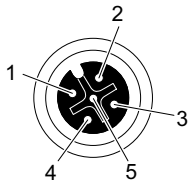
5.7.3 Pin assignment of fieldbus interface (X11/X12)

Ethernet (PROFINET, EtherNet/IP, or Modbus/TCP)					
X11 (Port1)	**Pin**	**Assignment**	**X12 (Port2)**	**Pin**	**Assignment**
Push-pull RJ45 plug connector 	**1**	TX+	Push-pull RJ45 plug connector 	**1**	TX+
	2	TX–		**2**	TX–
	3	RX+		**3**	RX+
	4	Res.		**4**	Res.
	5	Res.		**5**	Res.
	6	RX–		**6**	RX–
	7	Res.		**7**	Res.
	8	Res.		**8**	Res.

NOTICE

According to IEC PAS 61076-3-117, push-pull RJ45 sockets may only be used with the appropriate push-pull RJ45 mating connector. Commercially available RJ45 patch cables without push-pull connector housings do not lock into the connectors. Such cables can damage the sockets and are, therefore, not suitable.

5.7.4 I/O pin assignment (X21-X28)

I/Os					
12 DI + 4 DI/O	**Pin**	**X21**	**X22**	**X23 (Encoder 1 connection)**	**X24 (Encoder 2 connection)**
M12 plug connector, standard coding, female 	**1**	VO24-I	VO24-I	VO24-II	VO24-II
	2	DI01	DI03	DI05 Encoder track B	DI07 Encoder track B
	3	0V24_C	0V24_C	0V24_C	0V24_C
	4	DI00	DI02	DI04 Encoder track A	DI06 Encoder track A
	5	n.c.	n.c.	n.c.	n.c.
	Pin	**X25 (Encoder 3 connection)**	**X26**	**X27**	**X28**
	1	VO24-III	VO24-III	VO24-IV	VO24-IV
	2	DI09 Encoder track B	DI11	DI13/DO01	DI15/DO03
	3	0V24_C	0V24_C	0V24_S	0V24_S
	4	DI08 Encoder track A	DI10	DI12/DO00	DI14/DO02
	5	n.c.	n.c.	n.c.	n.c.
6 DI + 2 DI/O	**Pin**	**X21**	**X22**	**X23**	**X24**
M12 plug connector, standard coding, female 	**1**	VO24-I	VO24-I	VO24-II	VO24-II
	2	Res.	Res.	Res.	Res.
	3	0V24_C	0V24_C	0V24_C	0V24_C
	4	DI00	DI01	DI02	DI03
	5	n.c.	n.c.	n.c.	n.c.
	Pin	**X25**	**X26**	**X27**	**X28**
	1	VO24-III	VO24-III	VO24-IV	VO24-IV
	2	Res.	Res.	Res.	Res.
	3	0V24_C	0V24_C	0V24_S	0V24_S
	4	DI04	DI05	DI06/DO00	DI07/DO01
	5	n.c.	n.c.	n.c.	n.c.
4 DI	**Pin**	**X21**	**X22**	**X23 - X28**	
M12 plug connector, standard coding, female 	**1**	VO24	VO24	Res.	
	2	DI101	DI103	Res.	
	3	0V24_C	0V24_C	Res.	
	4	DI100	DI102	Res.	
	5	n.c.	n.c.	Res.	

12 DI + 4 DI/O	**MOVIFIT® versions with 12 DI + 4 DI/O**	
	Function level	**Fieldbus**
	Technology or System	All
	Classic	PROFINET, EtherNet/IP, Modbus/TCP

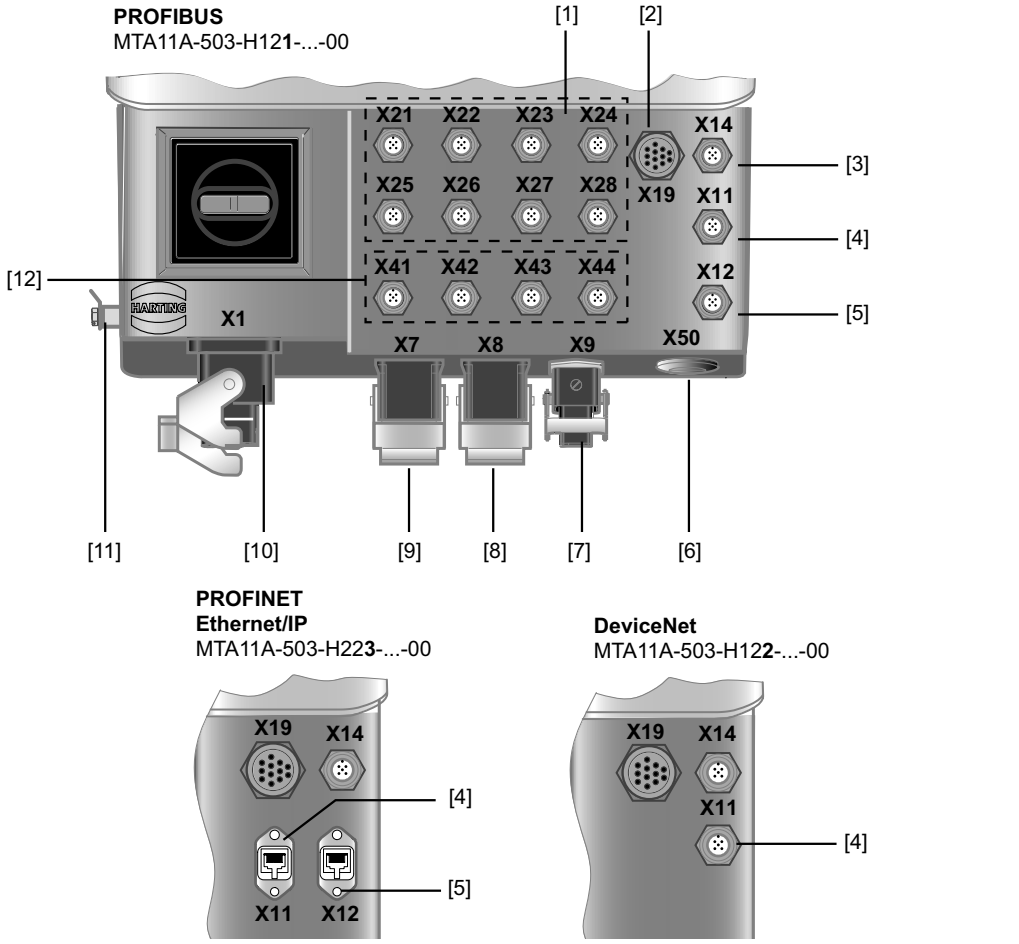
6 DI + 2 DI/O	**MOVIFIT® versions with 6 DI + 2 DI/O**	
	Function level	**Fieldbus**
	Classic	PROFIBUS or DeviceNet

4 DI	**MOVIFIT® versions with 4 DI**	
	Function level	**Fieldbus**
	None	SBus slave

5.8 Han-Modular®-ABOX "MTA...-H12.-...-00", "MTA...-H22.-...-00"

5.8.1 Description

The following figure shows the Han-Modular®-ABOX for MOVIFIT®-FC depending on the fieldbus interface:



936437515

[1] M12 plug connector for I/Os
[2] M23 plug connector (12-pin) for I/O extension box
[3] SBus (CAN)
[4] With PROFIBUS: PROFIBUS IN
With PROFINET + EtherNet/IP + Modbus/TCP: Ethernet port 1
With DeviceNet: Wired to X11 plug connector (micro-style connector)
[5] With PROFIBUS: PROFIBUS OUT or terminating resistor
With PROFINET + EtherNet/IP + Modbus/TCP: Ethernet port 2
[6] Diagnostics socket (RJ10) under the screw connection
[7] Han-Modular® plug connector for connecting an external braking resistor
[8] Han-Modular® plug connector for connecting motor 2 (MOVIFIT®-SC only)
[9] Han-Modular® plug connector for connecting motor 1
[10] Han-Modular® plug connector for power connection (power distribution with T adapter)
[11] PE connection
[12] M12 plug connector for optional I/Os

NOTICE

According to IEC PAS 61076-3-117, push-pull RJ45 sockets may only be used with the appropriate push-pull RJ45 mating connector. Commercially available RJ45 patch cables without push-pull connector housings do not lock into the connectors. Such cables can damage the sockets and are, therefore, not suitable.

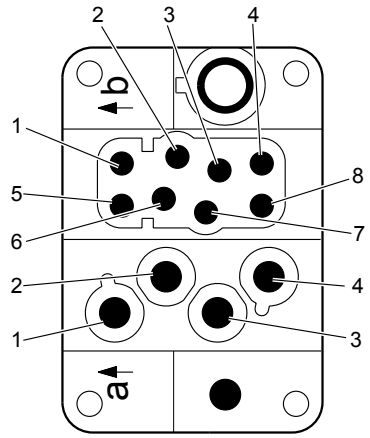
5.8.2 Variants

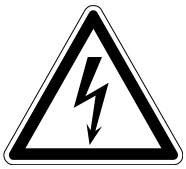
The following variants of the Han-Modular®-ABOX are available for MOVIFIT®-FC (MTF):

- MTA11A-503-H22.-...-00, MTA11A-503-H12.-...-00:
  - Optional external braking resistor
  - Optional integrated braking resistor
  - Switch disconnector integrated as standard

5.8.3 Power bus pin assignment (X1)

Power bus

X1	Pin	Assignment
Han-Modular® with 2 module pin inserts, male	**Module a (Han® CC Protected)**	
	**a.1**	Mains phase L1
	a.2	Mains phase L2
	a.3	Mains phase L3
	a.4	n.c.
	Module b (Han® EE)	
	b.1	+24V_C
	b.2	n.c.
	b.3	n.c.
	b.4	+24V_S
	b.5	0V24_C
	b.6	n.c.
	b.7	n.c.
	b.8	0V24_S
	Grounding pins	
	PE	PE/housing



⚠ DANGER

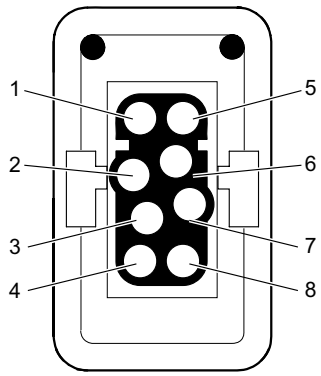
The maintenance switch only disconnects the integrated frequency inverter from the mains. Voltage is still present on the plug connector X1 of the MOVIFIT®.

Severe or fatal injuries from electric shock

- Switch off the power to the MOVIFIT® using a suitable external disconnecting device before touching the plug connector contacts.

5.8.4 Pin assignment of motor (X8)

Motor	Pin	X8
Han-Modular® Compact with Han® EE module, socket insert, female	**1**	TF+_M1
	2	13_M1
	3	U_M1
	4	W_M1
	5	TF-_M1
	6	14_M1
	7	15_M1
	8	V_M1
	PE	PE_M1

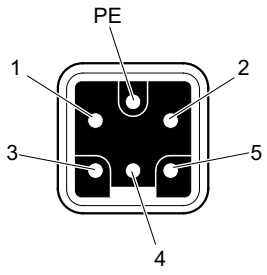


TIP

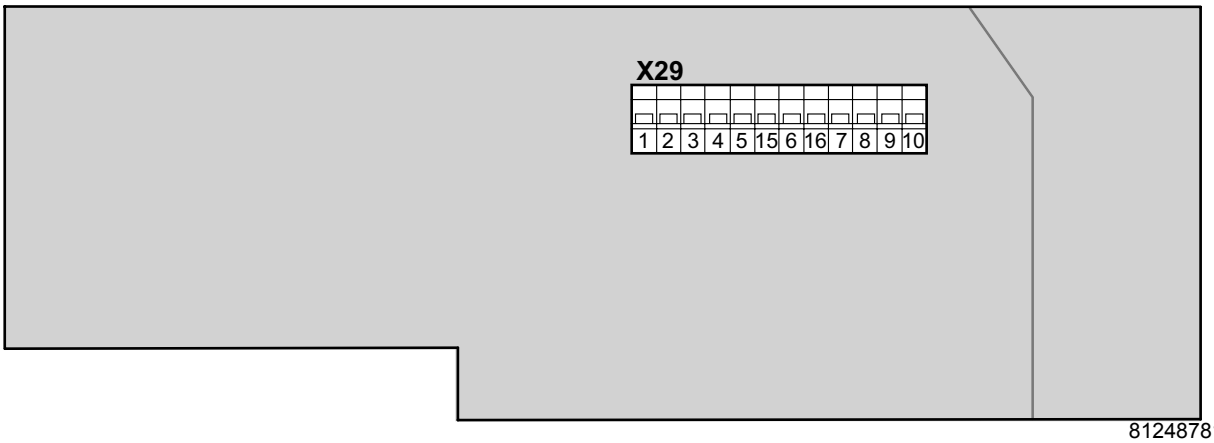
SEW-EURODRIVE recommends using the shielded and pre-fabricated SEW hybrid cables specifically designed for connecting MOVIFIT® and motor with Harting plug connectors, see the section "Hybrid cables" (see page 92).

5.8.5 Pin assignment of braking resistor (X6)

External braking resistor	Pin	X6
Han® Q5/0, socket insert, female	**1**	n.c.
	2	n.c.
	3	+R
	4	n.c.
	5	–R
	PE	PE/housing



5.8.6 24 V distributor terminal assignment for the integrated frequency inverter and the option card (X29)



24 V distributor terminal (for distributing the supply voltage(s) to the integrated frequency inverter and the option card)			
No.		**Name**	**Function**
X29	**1**	+24V_C	+24 V supply – continuous voltage (jumpered with X20/2)
	2	0V24_C	0V24 reference potential – continuous voltage (jumpered with X20/3)
	3	+24V_S	+24 V supply – switched (jumpered with X20/5)
	4	0V24_S	0V24 reference potential – switched (jumpered with X20/6)
	5	+24V_P	+24 V supply for integrated frequency inverter, supply
	15	+24V_P	
	6	0V24_P	0V24 reference potential for integrated frequency inverter, supply
	16	0V24_P	
	7	+24V_O	+24 V supply for option card, supply
	8	0V24_O	0V24 reference potential for option card, supply
	9	F-DO_STO_P	In connection with PROFIsafe option S11: Safety-related binary output F-DO_STO (P switching signal) for safe disconnection of the drive (STO)
	10	F-DO_STO_M	In connection with PROFIsafe option S11: Safety-related binary output F-DO_STO (M switching signal) for safe disconnection of the drive (STO)

⚠ DANGER

If you use the terminals X29/5, X29/6, X29/15, and X29/16 for safe disconnection, you must observe the SEW publication "Safe Disconnection for MOVIFIT®".

Severe or fatal injuries

- Observe the permissible wiring diagrams and safety conditions in the SEW publication "Safe Disconnection for MOVIFIT®".

⚠ DANGER

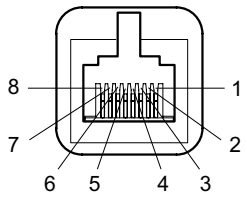
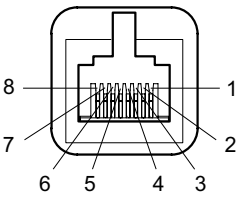
When you install and use the terminals X29/9 and X29/10, you must observe the SEW publication "Safe Disconnection for MOVIFIT®".

Severe or fatal injuries

- When using PROFIsafe option S11, observe the permissible wiring diagrams and safety conditions in the SEW publication "Safe Disconnection for MOVIFIT®".

5.8.7 Pin assignment of fieldbus interface

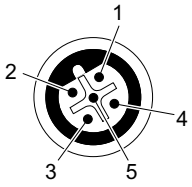
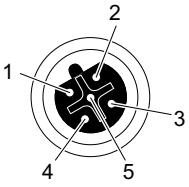
Ethernet (PROFINET, EtherNet/IP, or Modbus/TCP)

X11 (Port1)	Pin	Assignment	X12 (Port2)	Pin	Assignment
Push-pull RJ45 plug connector 	**1**	TX+	Push-pull RJ45 plug connector 	**1**	TX+
	2	TX–		**2**	TX–
	3	RX+		**3**	RX+
	4	Res.		**4**	Res.
	5	Res.		**5**	Res.
	6	RX–		**6**	RX–
	7	Res.		**7**	Res.
	8	Res.		**8**	Res.

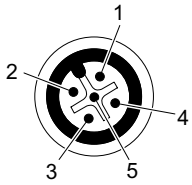
NOTICE

According to IEC PAS 61076-3-117, push-pull RJ45 sockets may only be used with the appropriate push-pull RJ45 mating connector. Commercially available RJ45 patch cables without push-pull connector housings do not lock into the connectors. Such cables can damage the sockets and are, therefore, not suitable.

PROFIBUS

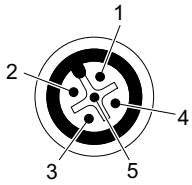
X11 (PROFIBUS IN)	Pin	Assignment	X12 (PROFIBUS OUT)	Pin	Assignment
M12 plug connector, B coding, male 	**1**	n.c.	M12 plug connector, B coding, female 	**1**	+5V_PB
	2	A_IN		**2**	A_OUT
	3	n.c.		**3**	0V5_PB
	4	B_IN		**4**	B_OUT
	5	FE		**5**	FE

DeviceNet

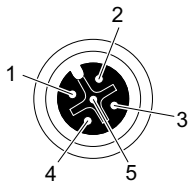
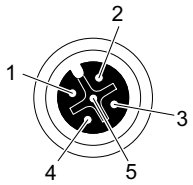
X11	Pin	Assignment
Micro-style connector, standard coding, male 	**1**	DRAIN
	2	V+
	3	V–
	4	CAND_H
	5	CAND_L

SBus (CAN)

Can only be used with function levels "Technology" or "System"

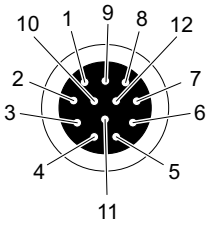
X14	Pin	Assignment
M12 plug connector, standard coding, male 	**1**	FE
	2	n.c.
	3	0V5-II
	4	CAN1_H
	5	CAN1_L

5.8.8 I/O pin assignment (X21-X28/X19/X41-X44)

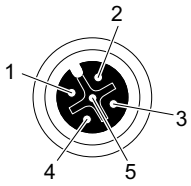
I/Os					
12 DI + 4 DI/O	**Pin**	**X21**	**X22**	**X23 (Encoder 1 connection)**	**X24 (Encoder 2 connection)**
M12 plug connector, standard coding, female 	**1**	VO24-I	VO24-I	VO24-II	VO24-II
	2	DI01	DI03	DI05 Encoder track B	DI07 Encoder track B
	3	0V24_C	0V24_C	0V24_C	0V24_C
	4	DI00	DI02	DI04 Encoder track A	DI06 Encoder track A
	5	FE	FE	FE	FE
	Pin	**X25 (Encoder 3 connection)**	**X26**	**X27**	**X28**
	1	VO24-III	VO24-II	VO24-IV	VO24-IV
	2	DI09 Encoder track B	DI11	DI13/DO01	DI15/DO03
	3	0V24_C	0V24_C	0V24_S	0V24_S
	4	DI08 Encoder track A	DI10	DI12/DO00	DI14/DO02
	5	FE	FE	FE	FE
6 DI + 2 DI/O	**Pin**	**X21**	**X22**	**X23**	**X24**
M12 plug connector, standard coding, female 	**1**	VO24-I	VO24-I	VO24-I	VO24-II
	2	Res.	Res.	Res.	Res.
	3	0V24_C	0V24_C	0V24_C	0V24_C
	4	DI00	DI01	DI02	DI03
	5	FE	FE	FE	FE
	Pin	**X25**	**X26**	**X27**	**X28**
	1	VO24-II	VO24-II	VO24-IV	VO24-IV
	2	Res.	Res.	Res.	Res.
	3	0V24_C	0V24_C	0V24_S	0V24_S
	4	DI04	DI05	DI06/DO00	DI07/DO01
	5	FE	FE	FE	FE

12 DI + 4 DI/O	**MOVIFIT® versions with 12 DI + 4 DI/O**	
	Function level	**Fieldbus**
	Technology or System	All
	Classic	PROFINET, EtherNet/IP, Modbus/TCP

6 DI +2 DI/O	**MOVIFIT® versions with 6 DI + 2 DI/O**	
	Function level	**Fieldbus**
	Classic	PROFIBUS or DeviceNet

I/O expansion (as an alternative for standard I/Os) **Can only be used in connection with MOVIFIT® versions with 12 DI + 4 DI/O**		
X19	**Pin**	**Assignment**
M23 plug connector (female) 	**1**	DI01
	2	DI03
	3	DI05
	4	DI07
	5	DI09
	6	DI11
	7	DI13/DO01[1)]
	8	DI15/DO03[1)]
	9	0V24_C
	10	0V24_C
	11	V024-III
	12	FE

1) Important: The reference potential is 0V24_S. When you use inputs DI13 and DI15 or outputs DO01 and DO03 via the X19 expansion connector, the 0V24_C and 0V24_S reference potentials must be connected to one another (e.g. via terminal X29).

Option I/Os with PROFIsafe option S11					
	Pin	**X41**	**X42**	**X43**	**X44**
M12 plug connector, standard coding, female 	**1**	F-SS0	F-SS0	Reserved	Reserved
	2	F-DI01	F-DI03	F-DO00-M	F-DO01-M
	3	0V24_O	0V24_O	0V24_O	0V24_O
	4	F-DI00	F-DI02	F-DO00-P	F-DO01-P
	5	F-SS1	F-SS1	Reserved	Reserved

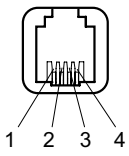
⚠ DANGER

When you install and use plug connectors X41 to X44, you must observe the SEW publication "Safe Disconnection for MOVIFIT®".

Severe or fatal injuries

- When using PROFIsafe option S11, observe the permissible wiring diagrams and safety conditions in the SEW publication "Safe Disconnection for MOVIFIT®".

5.8.9 Pin assignment of diagnostic interface

Diagnostic interface		
X50	**Pin**	**Assignment**
Diagnostic interface X50 (RJ10 socket) 	**1**	+5 V
	2	RS+
	3	RS–
	4	0V5

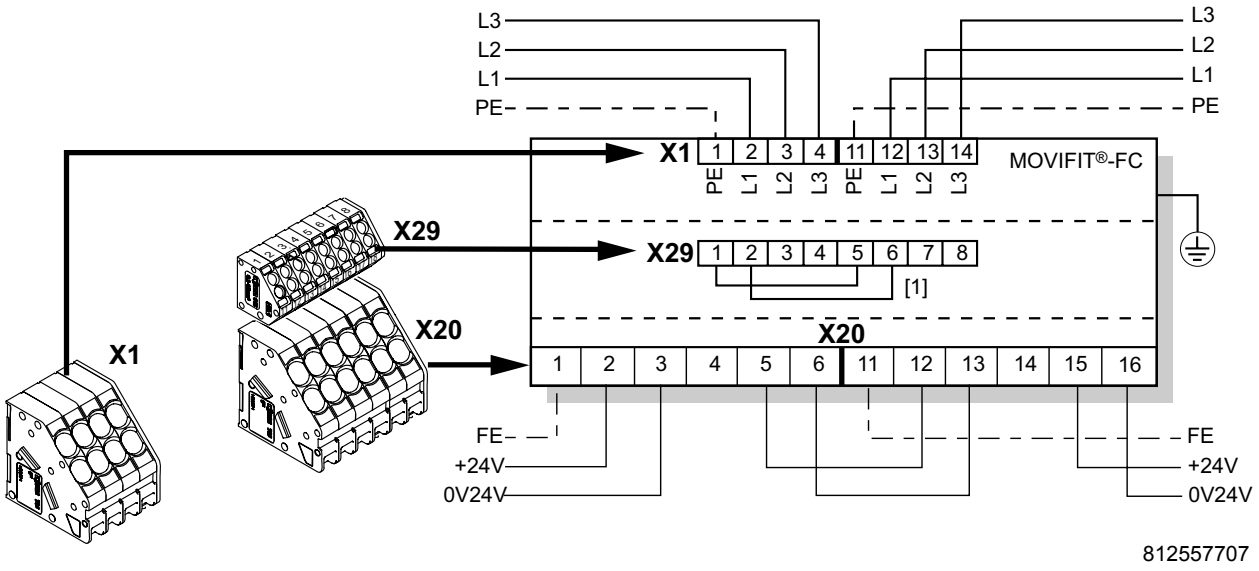
5.9 Power bus connection examples

5.9.1 Power bus in conjunction with terminal connection

	TIP
	The examples are valid for the following connection boxes: • Standard ABOX "MTA...-S02.-...-00" • Hybrid ABOX "MTA...-S42.-...-00" • Hybrid ABOX "MTA...-S52.-...-00" • Hybrid ABOX "MTA...-S62.-...-00"

Connection example with a common 24 V voltage circuit

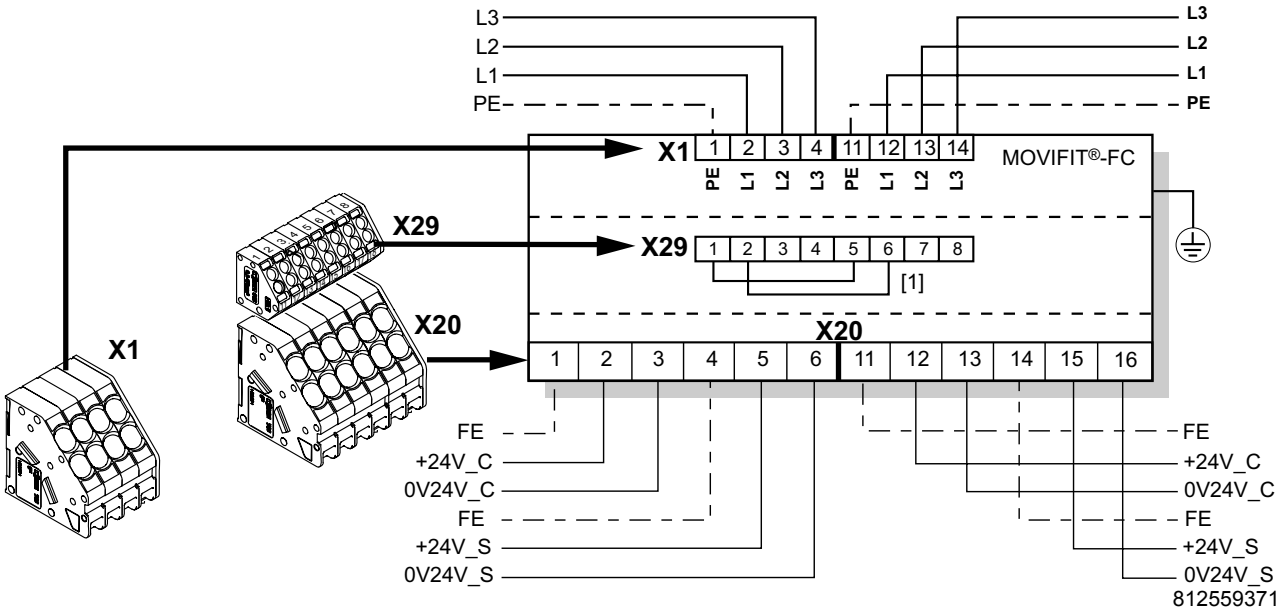
The following figure shows a connection example for the power bus with a common 24 V voltage circuit for the sensor/actuator supply. In the example, the integrated frequency inverter is supplied by the voltage 24V_C:



[1] Example for integrated frequency inverter supplied by 24V_C

Connection example with two separate 24 V voltage circuits

The following figure depicts a basic connection example for the power bus with two separate 24 V voltage circuits for sensor/actuator supply. In the example, the integrated frequency inverter is supplied by the voltage 24V_C:



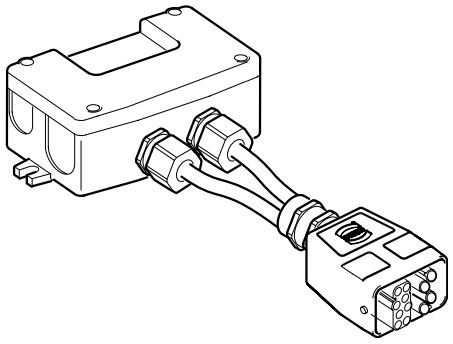
[1] Example for integrated frequency inverter supplied by 24V_C

5.9.2 Power bus with Han-Modular® plug connector

	TIP
	This example applies for the following connection box: • Han-Modular®-ABOX "MTA...-H12.-...-00" • Han-Modular®-ABOX "MTA...-H22.-...-00"

Power distribution and line protection

- SEW-EURODRIVE recommends using HARTING Power S products for power bus project planning.
- Two lines of max. 6 mm^2 can be routed in the AC 400 V 50/60 Hz and DC 24 V supply cable.
- The spur lines leading to MOVIFIT® have a cross section of 4 mm^2 and are a maximum of 1.5 m long.
- The Han Power S distributor is available from Harting (part number 6104 202 1069).



812456203

- Supply sensor, group IV (24V_S)

  In the connector of the Han Power S distributor mentioned above (part number 6104 202 1069), the 24V_S supply voltage of sensor supply group IV is jumpered with 24V_C continuous voltage.

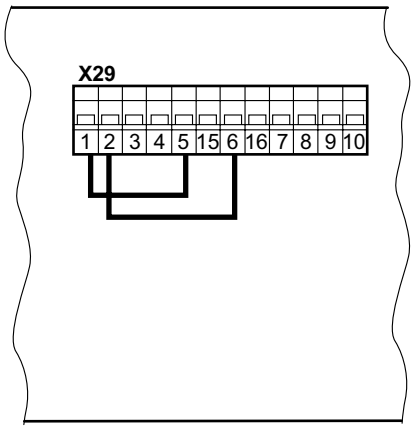
Accessories:

Harting provides the following accessories for the Han Power S distributor.

Type	Cable diameter	Part number at Harting
Bushing seal for small entry	7-10 mm	0912 000 9965
	10-13 mm	0912 000 9966
	13-16 mm	0912 000 9967
Filler plug for small entry		0912 000 9968
Bushing seal for large entry	7-10 mm	0912 000 9969
	10-13 mm	0912 000 9970
	13-16 mm	0912 000 9971
	16-19 mm	0912 000 9972
	19-22 mm	0912 000 9973
Filler plug for large entry		0912 000 9974

Inverter supply

The following figure shows an example of the wiring of the X29 terminal for supplying the integrated frequency inverter from 24V_C:



812489483

5.10 Fieldbus systems connection examples

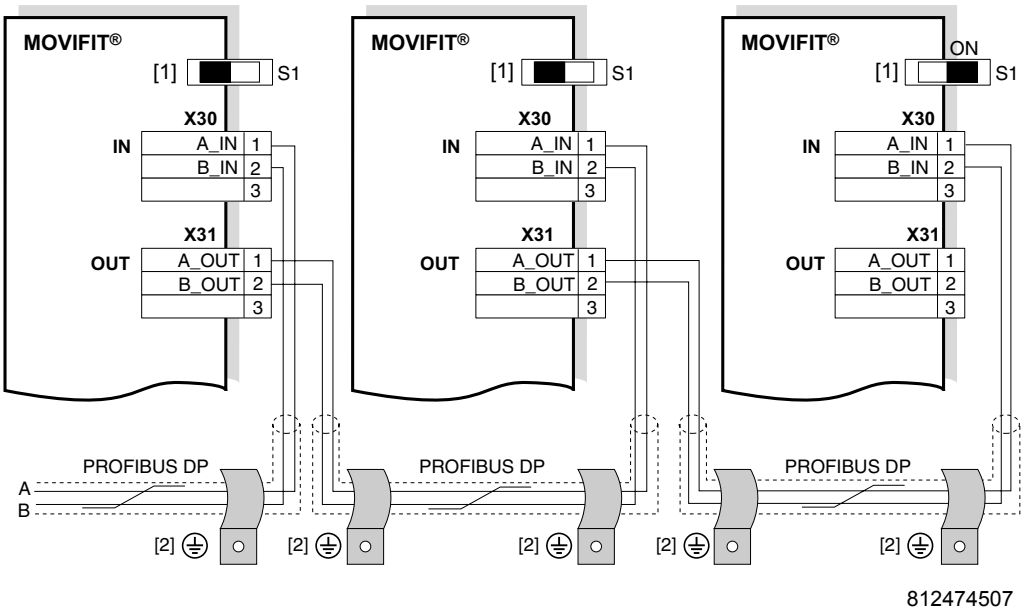
5.10.1 PROFIBUS

Via terminals

	TIP
	The example applies for the following connection box: • Standard ABOX "MTA...-S02.-...-00" • Hybrid ABOX "MTA...-S42.-...-00"

The following figure shows the PROFIBUS connection via terminals:

- If MOVIFIT® is located at the end of a PROFIBUS segment, it can only be connected to the PROFIBUS mains by the incoming PROFIBUS line.
- To prevent malfunctions in the bus system due to reflections, etc., the PROFIBUS segment must be terminated at the first and last physical stations with bus terminating resistors.
- The bus terminating resistors are already installed in the MOVIFIT®-ABOX and they can be activated using the S1 switch.



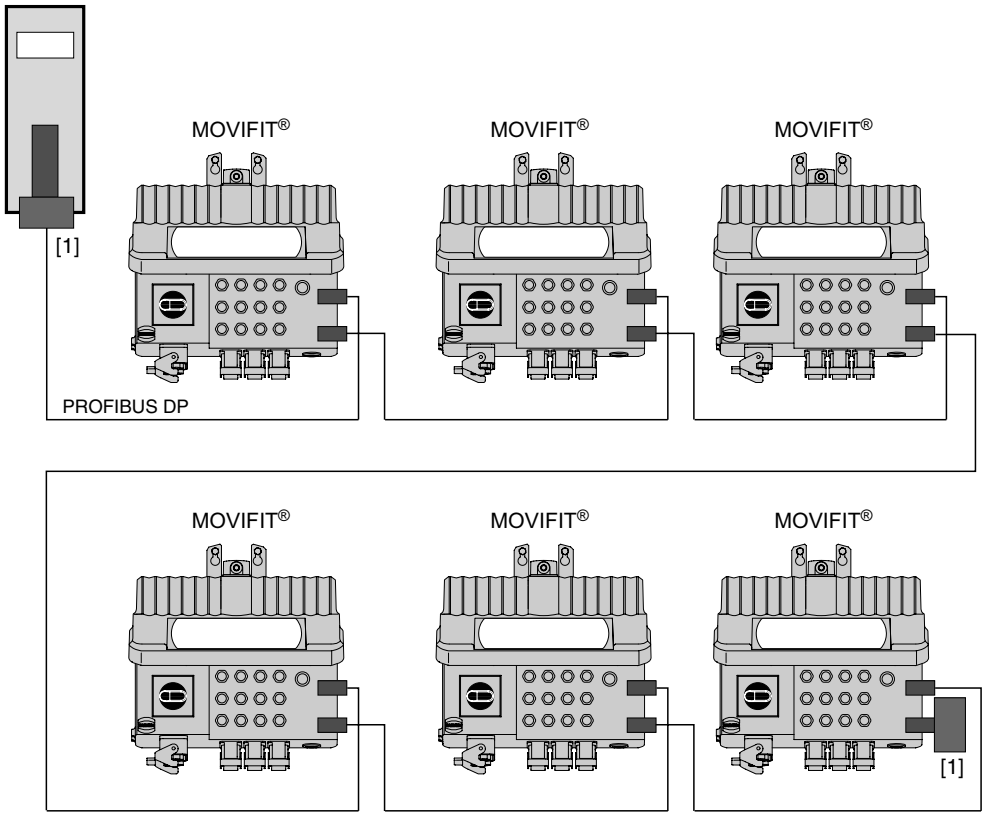
[1] DIP switch S1 for bus termination
[2] Shield plate, see section "Connecting the PROFIBUS line" (see page 47)

Via M12 plug connectors

	TIP
	The example applies for the following connection boxes: • Hybrid ABOX "MTA...-S52.-...-00" • Han-Modular®-ABOX "MTA...-H12.-...-00"

The following figure depicts the basic connection topology for PROFIBUS using M12 plug connectors (the example shows a Han-Modular®-ABOX):

- The connection boxes have M12 plug connectors for connection to the PROFIBUS. They comply with the recommendations of PROFIBUS directive no. 2.141 "Connection technology for PROFIBUS".
- To prevent malfunctions in the bus system due to reflections, etc., the PROFIBUS segment must be terminated at the first and last physical stations with bus terminating resistors.
- A plug-in bus terminator (M12) must be used for the last station in place of the outgoing bus connection.



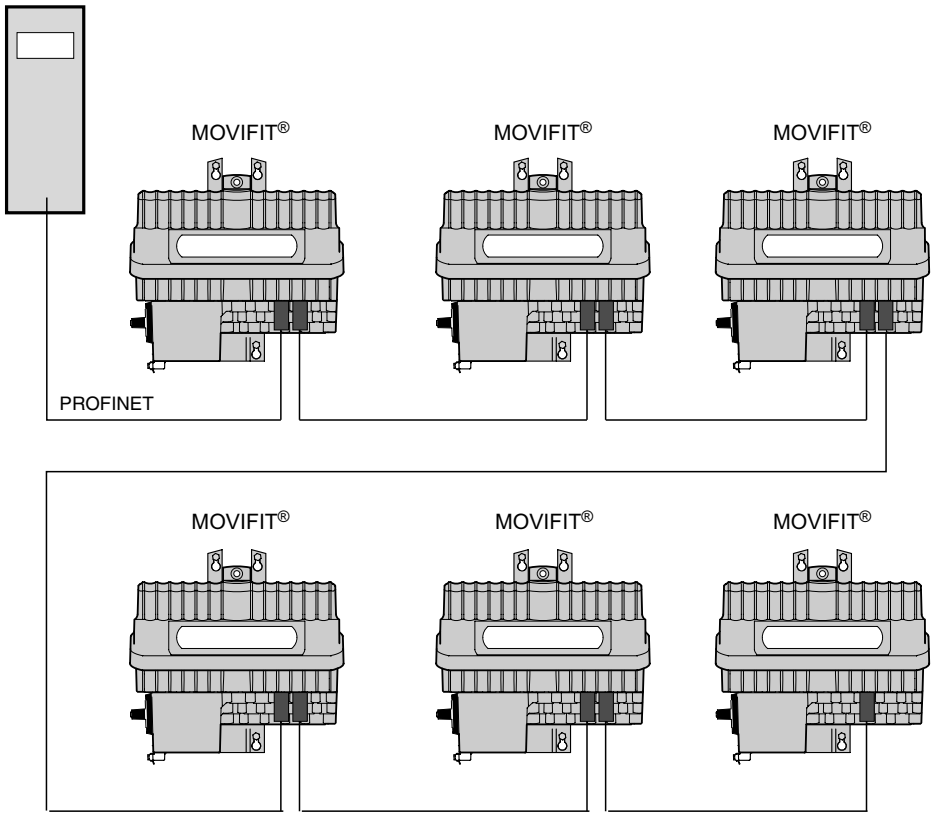
812484491

[1] Bus terminating resistor

5.10.2 PROFINET / EtherNet/IP

	TIP
	The example applies for the following connection boxes: • Standard ABOX "MTA...-S02.-...-00" • Hybrid ABOX "MTA...-S42.-...-00" • Hybrid ABOX "MTA...-S52.-...-00" • Hybrid ABOX "MTA...-S62.-...-00" • Han-Modular®-ABOX "MTA...-H22.-...-00"

The following figure depicts the basic connection topology for PROFINET (using a hybrid ABOX as an example):



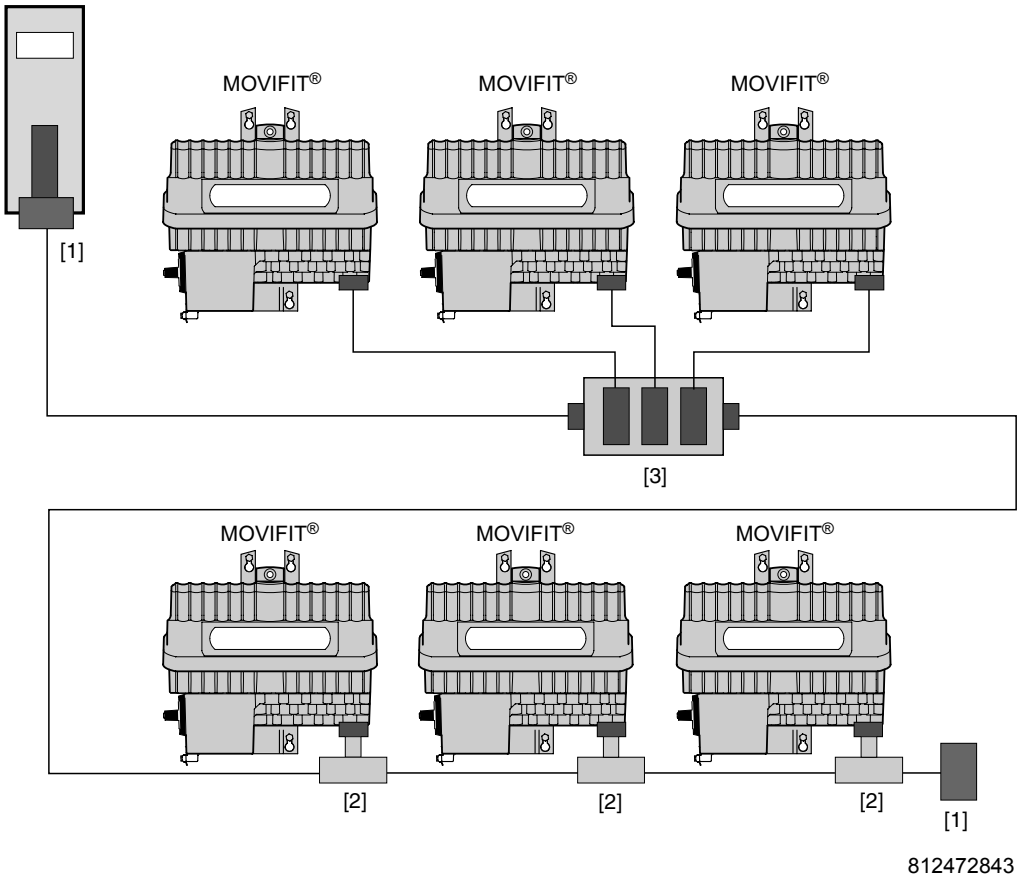
812486155

5.10.3 DeviceNet

	TIP
	The example applies for the following connection boxes: • Standard ABOX "MTA...-S02.-...-00" • Hybrid ABOX "MTA...-S52.-...-00" • Han-Modular®-ABOX "MTA...-H12.-...-00"

The following figure shows the basic connection topology for DeviceNet using a micro-style connector (the example depicts an ABOX with terminals and cable bushings):

- The connection can be made via a multiport or T connector. Observe wiring instructions compliant with DeviceNet specification 2.0.
- The DeviceNet segment must be terminated using bus terminating resistors at the first and last physical station to prevent malfunctions in the bus system due to reflections, etc.
- Use external bus terminating resistors.



[1] Bus terminating resistor 120 Ω
[2] T connector
[3] Multiport

5.11 Encoder connection

5.11.1 Connecting the NV26 proximity sensor

Properties

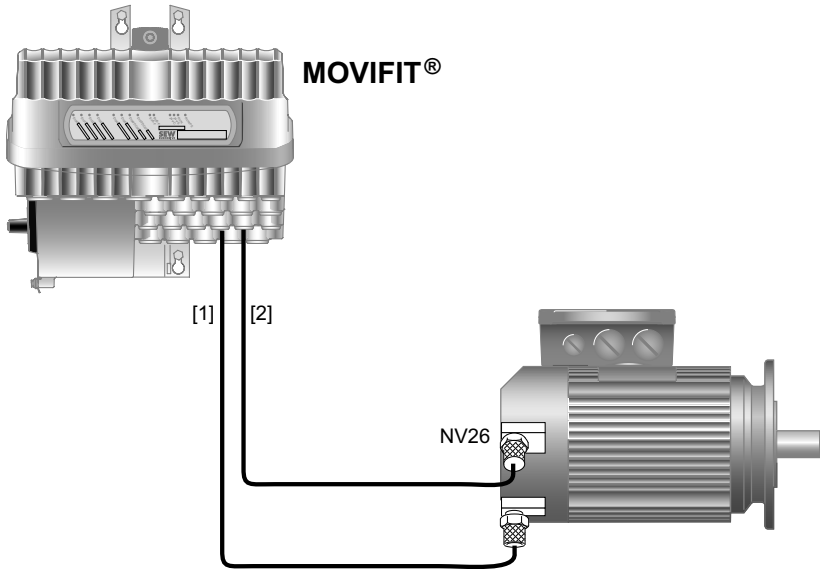
The NV26 proximity sensor offers the following features:

- 2 sensors with 6 pulses/revolution
- 24 increments/revolution with 4-fold evaluation
- Encoder monitoring and evaluation is possible with MOVIFIT® function level "Technology".

There must be a 45° angle between the sensors.

Installation

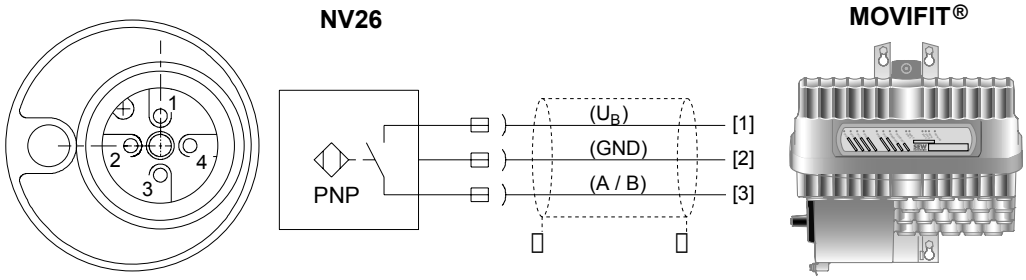
- Use shielded cables to connect the NV26 proximity sensor to the matching encoder inputs of MOVIFIT®.
  - For standard ABOX, see section "Fieldbus/option-independent terminal assignment", X25 terminal (see page 49)
  - For hybrid ABOX or Han-Modular®-ABOX, see section "I/O pin assignment".
    (see page 63), (see page 68), (see page 72), (see page 78)



940059275

[1] Encoder input MOVIFIT® track B
[2] Encoder input MOVIFIT® track A

Wiring diagram



940197899

[1] [1] +24 V supply voltage
[2] [2] 0V24 reference potential
[3] [3] Encoder input MOVIFIT® track A or track B

5.11.2 Connecting the incremental encoder ES16

Properties

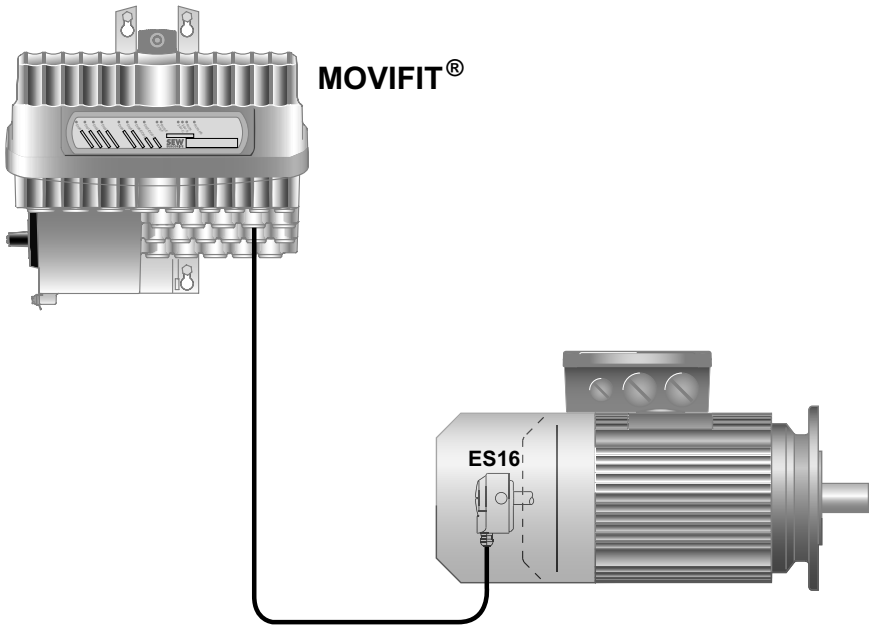
The ES 16 incremental encoder offers the following features:

- 6 pulses/revolution for each track
- 24 increments/revolution with 4-fold evaluation
- Encoder monitoring and evaluation is possible with MOVIFIT® function level "Technology".

Installation

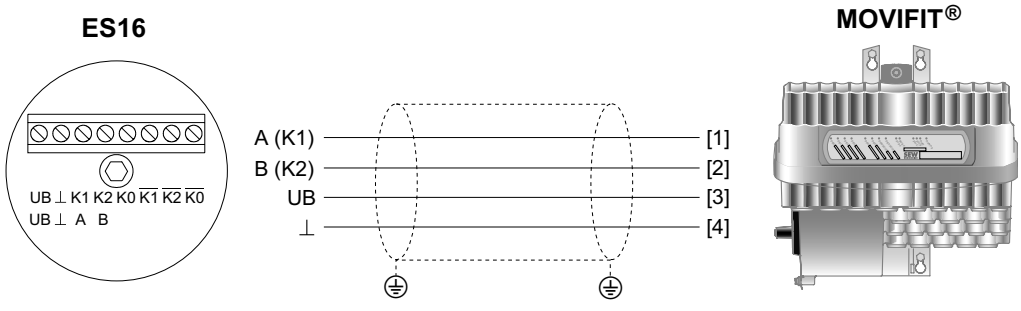
- Use a shielded cable to connect the ES16 incremental encoder to the matching encoder inputs of MOVIFIT®.
  - For standard ABOX, see section "Fieldbus/option-independent terminal assignment", X25 terminal (see page 49).
  - For hybrid ABOX or Han-Modular®-ABOX, see section "I/O pin assignment".

    (see page 63), (see page 68), (see page 72), (see page 78)



940193803

Wiring diagram



940061195

[1] Encoder input MOVIFIT® track A
[2] Encoder input MOVIFIT® track B
[3] +24 V supply voltage
[4] 0V24 reference potential

5.11.3 Connecting the incremental encoder EI7.

Properties

The E17. incremental encoder offers the following features:

- HTL or sin/cos interface (MOVIFIT® does **not** evaluate sin/cos signals)

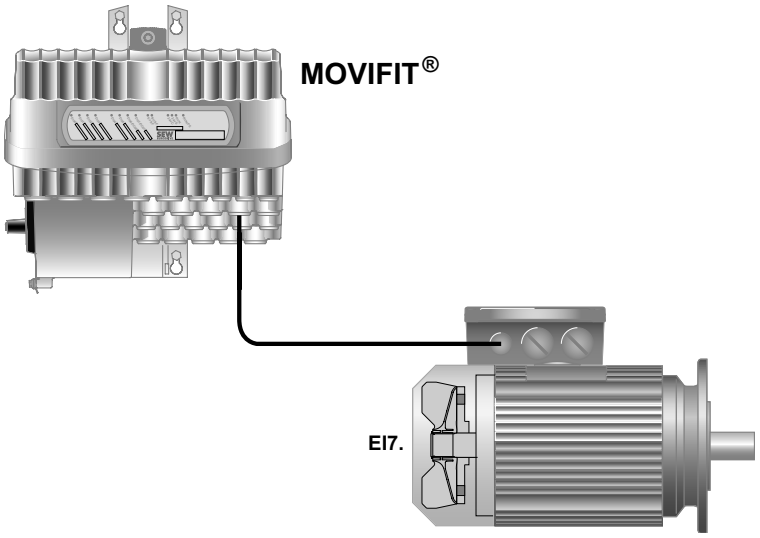
EI71:	1 pulse/revolution	=> 4 increments/revolution[1)]
EI72:	2 pulses/revolution	=> 8 increments/revolution[1)]
EI76:	6 pulses/revolution	=> 24 increments/revolution[1)]
EI7C:	24 pulses/revolution	=> 96 increments/revolution[1)]

1) With 4-fold evaluation

- Encoder monitoring and evaluation is possible with MOVIFIT® function level "Technology".

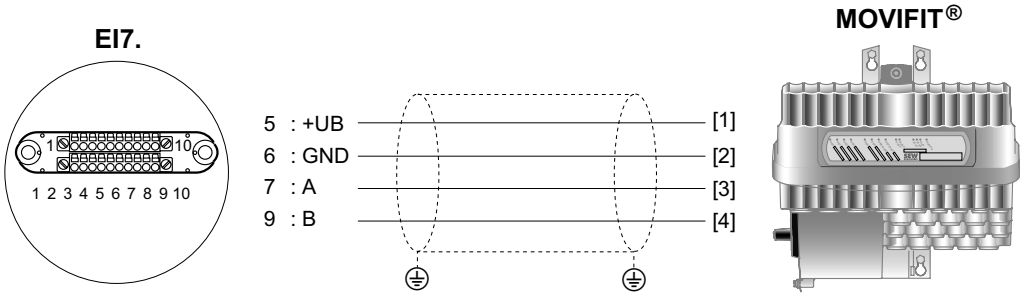
Installation

- Use a shielded cable to connect the EI7. incremental encoder to the matching encoder inputs of MOVIFIT®.
  - For standard ABOX, see section "Fieldbus/option-independent terminal assignment", X25 terminal (see page 49).
  - For hybrid ABOX or Han-Modular®-ABOX, see section "I/O pin assignment".
    (see page 63), (see page 68), (see page 72), (see page 78)



995367179

Wiring diagram



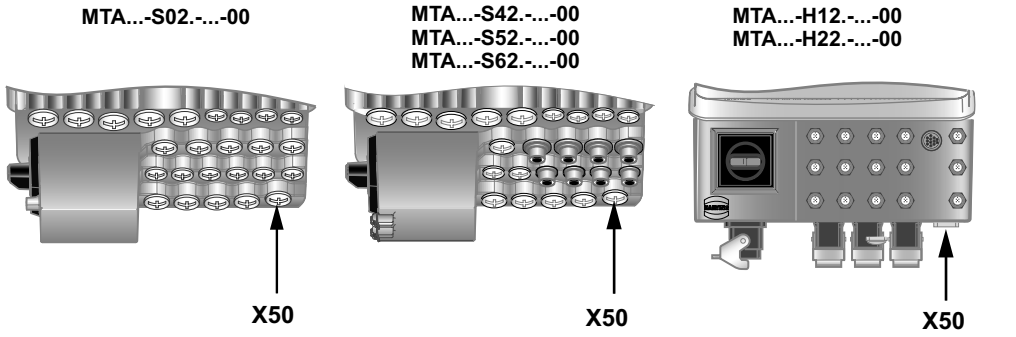
991622027

[1] +24 V supply voltage
[2] 0V24 reference potential
[3] Encoder input MOVIFIT® track A
[4] Encoder input MOVIFIT® track B

5.12 PC connection

5.12.1 Diagnostic interface

MOVIFIT® units have an X50 diagnostic interface (RJ10 plug connector) for startup, parameter setting, and servicing.

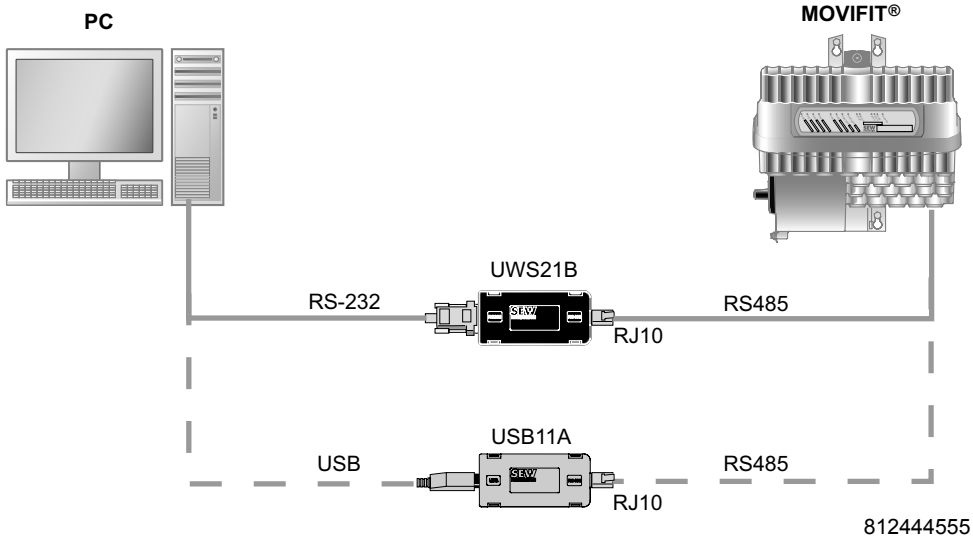


	TIP
	Depending on the function level used, different functions are available. These are described in the corresponding manuals. • Manual for MOVIFIT® function level "Classic..." • Manual for MOVIFIT® function level "Technology..." • Manual for MOVIFIT® function level "System"

5.12.2 Interface adapter

The diagnostic interface can be connected to a PC using one of the following options:

- UWS21B with serial interface RS-232, part number 1 820 456 2
- USB11A with USB interface, part number 0 824 831 1



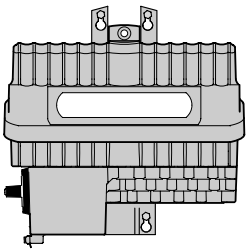
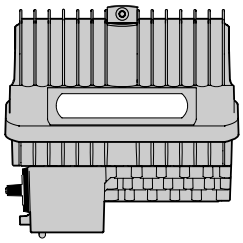
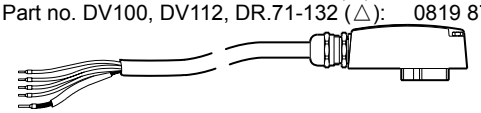
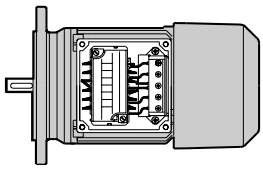
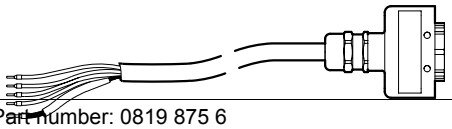
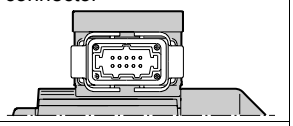
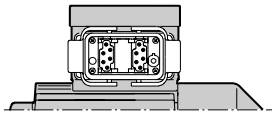
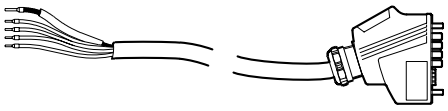
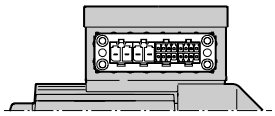
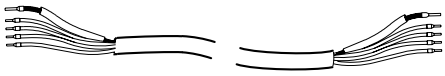
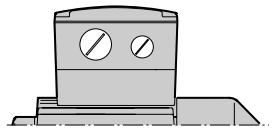
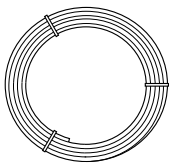
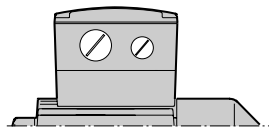
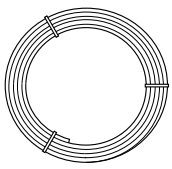
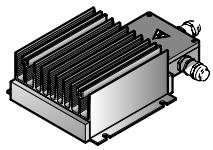
Scope of delivery:

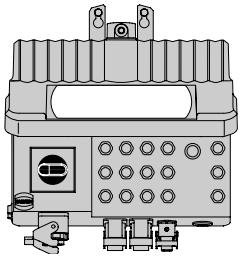
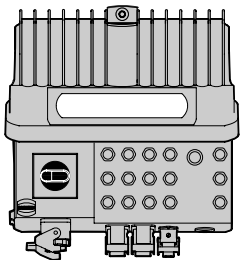
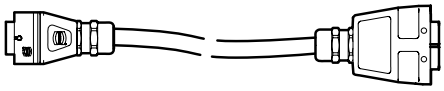
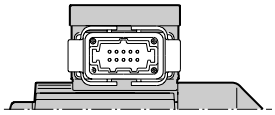
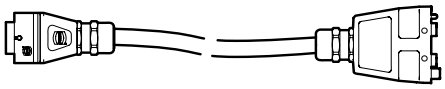
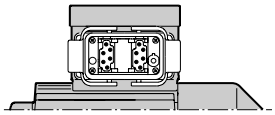
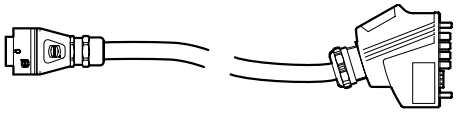
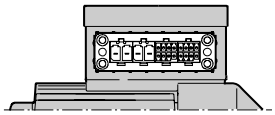
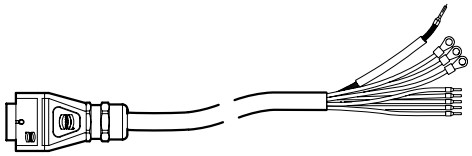
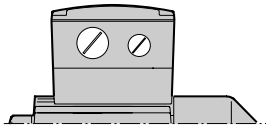
- Interface adapter
- Cable with RJ10 plug connector
- Interface cable RS-232 (UWS21B) or USB (USB11A)

5.13 Hybrid cables

5.13.1 Overview

Hybrid cables are available for connecting MOVIFIT®-FC and motors. The following table provides an overview of the available hybrid cables:

MOVIFIT®-FC	Hybrid cables	Length	Cable type	Drive
Standard ABOX: **MTA...-S02.-...-00** **Hybrid ABOX:** **MTA...-S42.-...-00** **MTA...-S52.-...-00** **MTA...-S62.-...-00**  	Part no. DR63 / DT71-90 (⅄): 0819 967 1 Part no. DR63 / DT71-90 (△): 0819 969 8 Part no. DV100, DV112 DR.71-132 (⅄): 0819 970 1 Part no. DV100, DV112, DR.71-132 (△): 0819 874 8 	Variable	A	Motor with ISU4 (02CI) plug connector 
	Part number: 0819 972 8 	Variable	A	Motor with ASB4 (BA01AB04DA) plug connector 
	Part number: 0819 875 6 	Variable	A	Motor with plug connector AMB4 (MA01AB04DA) 
	Part number: 0819 973 6 	Variable	A	Motor with APG4 plug connector 
	Part number: 0819 975 2 	Variable	A	Motor with cable glands 
	Part number: 0818 736 3 (hybrid cable drum) Part number: 0818 739 8 (hybrid cable drum) 	30 m 100 m (328 ft)	A	Motor with cable glands ASEPTIC DAS motor 
	Part number: 1172 378 5 (cable drum) 	30 m	-	External braking resistor 

MOVIFIT®-FC	Hybrid cables	Length	Cable type	Drive
Han-Modular®-ABOX: **MTA...-H12.-...-00** **MTA...-H22.-...-00**  	Part number: 1810 096 1 	Variable	A	Motor with ASB4 (BA01AB04DA) plug connector 
	Part number: 1810 098 8 	Variable	A	Motor with plug connector AMB4 (MA01AB04DA) 
	Part number: 1810 099 6 	Variable	A	Motor with APG4 plug connector 
	Part number: DT/DV71-100 1811 121 1 Part number: DV112 1811 128 9 	Variable	A	Motor with cable glands 

5.13.2 Connecting hybrid cables

With open cable end (MOVIFIT® side) and plug connector (motor side)

The table shows the assignment of the following hybrid cables:

- Part number 0819 967 1
  0819 969 8
  0819 970 1
  0819 874 8
- Part number 0819 972 8
- Part number 0819 875 6
- Part number 0819 973 6

MOVIFIT®-FC connecting terminal	Hybrid cables Color coding/marking
X8/1	Green/yellow
X8/2	Black/U1
X8/3	Black/V1
X8/4	Black/W1
X8/5	Blue/15
X8/6	White/14
X8/7	Red/13
X81/1	Black/1
X81/2	Black/2
The inner shield is applied across a shield plate, and the overall shield is applied with an EMC cable gland on the housing of the MOVIFIT®-ABOX, see section "Connecting hybrid cables" (see page 48).	Shield end

With open cable end (MOVIFIT® and motor side)

The table shows the assignment of the following hybrid cables:

- Part number 0819 975 2
- Part number 0 818 736 3
- Part number 0 818 739 8

MOVIFIT®-FC connection terminal	Hybrid cables Color coding/marking	Connection terminal Motor
X8/1	Green/yellow	PE terminal
X8/2	Black/U1	U1
X8/3	Black/V1	V1
X8/4	Black/W1	W1
X8/5	Blue/15	5a
X8/6	White/14	3a
X8/7	Red/13	4a
X81/1	Black/1	1a
X81/2	Black/2	2a
The inner shield is applied across a shield plate, and the overall shield is applied with an EMC cable gland on the housing of the MOVIFIT®-ABOX, see section "Connecting hybrid cables" (see page 48).	Shield end	The inner shield is applied using the PE terminal, and the overall shield is applied with an EMC cable gland on the motor housing.

With plug connector (MOVIFIT® side) and open cable end (motor side)

The table shows the assignment of the following hybrid cables:

- Part number 1811 121 1
  1811 128 9

Hybrid cables Color coding/marking	Connection terminal Motor
Green/yellow	PE terminal
Black/U1	U1
Black/V1	V1
Black/W1	W1
Blue/15	5a
White/14	3a
Red/13	4a
Black/1	1a
Black/2	2a
Shield end	The inner shield is applied using the PE terminal, and the overall shield is applied with an EMC cable gland on the motor housing.

6 Startup

6.1 Startup instructions

⚠ DANGER

You must disconnect the units from the mains before removing or installing the MOVIFIT®-EBOX. Dangerous voltages may still be present for up to one minute after disconnection from the power supply.

Severe or fatal injuries from electric shock

- Disconnect MOVIFIT® from the mains using an appropriate external disconnecting device and secure it against unintentional reconnection to the voltage supply.
- Then wait at least for 1 minute.

⚠ WARNING

The surfaces of MOVIFIT® and of the external options, for example, the braking resistor, can reach high temperatures during operation.

Danger of burns

- Do not touch MOVIFIT® or the external options until they have sufficiently cooled.

NOTICE

Never remove the MOVIFIT®-FC EBOX during operation. Doing so can lead to dangerous electric arcs forming between the EBOX and the ABOX, which can cause irreparable damage to the unit (risk of fire, irreparable contacts).

Deactivating the mains phase failure check (parameter 522) in unfavorable operating conditions can damage the unit.

- Never remove the MOVIFIT®-SC EBOX during operation.
- Do not deactivate the mains phase failure check (parameter 522) in unfavorable operating conditions.

6.1.1 Wiring notes for connecting the motor

- Motor phases U, V, and W must be connected correctly in accordance with the motor connection terminals in MOVIFIT®. This ensures that the motor rotates in the correct direction. The motor and the temperature sensors must be connected to terminals X8 and X81.

⚠ DANGER

Incorrect connection will cause incorrect motor rotation and/or uncontrolled motor startup.

Severe or fatal injuries

- Check the wiring before starting the motor.

6.1.2 Wiring notes for brakes

- Brakes with voltages less than 40 V cannot be used in connection with MOVIFIT®-FC.
- For operating SEW motors with a brake, the brake can be connected to the terminals in MOVIFIT®, which are provided for the SEW brake, without any further measures (do not use a brake rectifier). This requires connecting an SEW brake for a voltage of 110 V, 120 V, 230 V, or 400 V.
- The digital output DB00 on MOVIFIT® is available for operating non-SEW motors with a brake. These outputs can be used to control non-SEW brake(s) using appropriate additional measures (e.g. brake rectifier).

⚠ DANGER

If you use binary output DB00 to control the brake, do not change the parameters of the binary output functions.

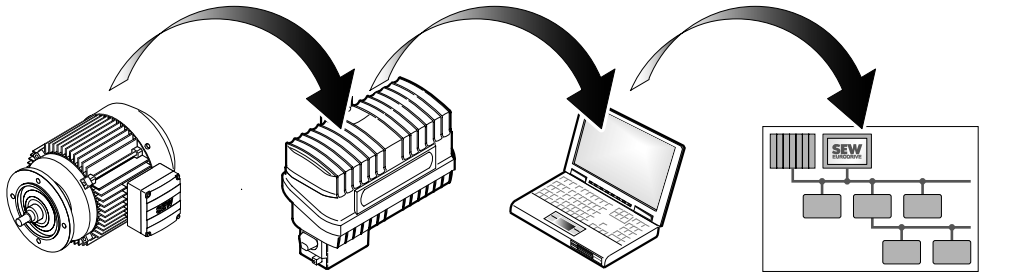
Severe or fatal injuries

- Before using the binary output for controlling the brake, check the parameter settings.

6.2 Startup procedure for MOVIFIT®-FC

The following section describes how to start up MOVIFIT®-FC. Depending on the MOVIFIT® function level, note additional documentation for fieldbus configuration and advanced startup/parameter setting.

The following tables provide an overview of MOVIFIT®-FC startup and refer to additional publications:



Function level	1. Startup Motor	2. Startup MOVIFIT®-FC	3. Parameter setting[1] Programming	4. Fieldbus configuration
Classic	Observe: • "DR/DV/DT/DTE/DVE AC Motors, CT/CV Asynchronous Servomotors" operating instructions • or "AC Motors DRS/DRE/DRP" operating instructions	• Section "Startup instructions" (see page 97) • Section "Startup MOVIFIT®-FC" (see page 99) • Section "Startup MOVIFIT® frequency inverter" (see page 104)	Manual "MOVIFIT® Function Level Classic..."[2]	
Technology			Manual "MOVIFIT® Function Level Technology .."[2]	
			Manual "MOVI-PLC® Programming in the PLC Editor" Manual "MPLCMotion_MC07 and MPLCMotion_MM Libraries for MOVI-PLC®"	
System			Manual "Configuration and Diagnostic Tool MOVIVISION®" Manual "MOVIFIT® Function Level System"	

1) You only have to set parameters when the "Expert" mode is activated.

2) The "MOVIFIT® Function Level Classic" and "MOVIFIT® Function Level Technology" manuals are available in several fieldbus-specific versions.

⚠ DANGER

If you are using applications with safe disconnection, you must additionally observe the SEW publication "Safe Disconnection for MOVIFIT®".

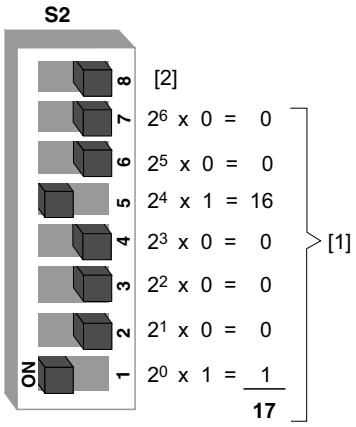
Severe or fatal injuries

- Observe additional startup instructions and safety conditions in the SEW publication "Safe Disconnection for MOVIFIT®".

6.3 Startup MOVIFIT®

6.3.1 Startup in conjunction with PROFIBUS

1. Check the MOVIFIT® connection.
2. Set the PROFIBUS address at DIP switch S2 of the MOVIFIT®-ABOX, see section "ABOX" (see page 14). Use DIP switches 1 to 7 to set the PROFIBUS address.



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[1] Example: Address 17
[2] Switch 8 = reserved

Addresses 1 to 125: Valid addresses
Addresses 0, 126, 127: are not supported

The following table uses address 17 as an example to show how to determine the DIP switch settings for any bus address:

DIP switch setting	Value
DIP 1 = ON	1
DIP 2 = OFF	2
DIP 3 = OFF	4
DIP 4 = OFF	8
DIP 5 = ON	16
DIP 6 = OFF	32
DIP 7 = OFF	64

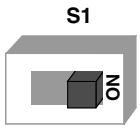
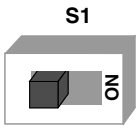
3. Connect Bus connection to MOVIFIT® at the last bus station.
   - If MOVIFIT® is located at the end of a PROFIBUS segment, the unit can only be connected to the PROFIBUS mains via the incoming PROFIBUS line.
   - To prevent malfunctions in the bus system due to reflections, etc., the PROFIBUS segment must be terminated using bus terminating resistors at the first and last physical stations.

	TIP
	The PROFIBUS is not interrupted when you remove the EBOX (electronics unit) from the ABOX (connection unit).

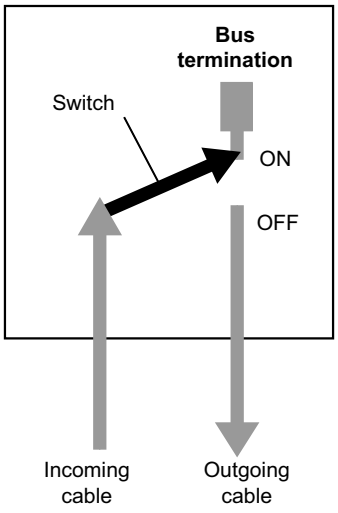
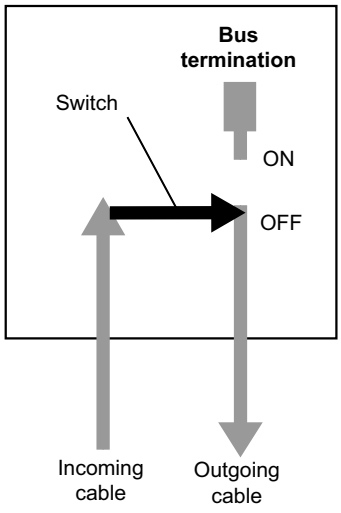
4. To start up the MOVIFIT® frequency inverter, see the section "Startup MOVIFIT® Frequency Inverter" (see page 104).
5. Mount the MOVIFIT®-EBOX on the ABOX and close it.
6. Switch on the 24V_C and 24V_S supply voltage(s). The associated control LEDs should now light up green.

Bus termination

The bus terminating resistors are already installed in the MOVIFIT®-ABOX (only with standard ABOX "MTA...-S02.-...-00" and hybrid ABOX "MTA...-S42.-...-00") and can be activated using switch S1, see section "ABOX" (see page 14):

Bus termination ON = on	**Bus termination OFF = off (factory setting)**
 837515659	 837519755

The following table shows the operating principle of the bus termination switch:

Bus termination switch S1	
Bus termination ON = on	**Bus termination OFF = off**
 837562251	 837566347

	TIP
	When using the following connection boxes, please note: • Hybrid ABOX "MTA...-S52.-...-00" • Han-Modular®-ABOX "MTA...-H12.-...-00" In contrast to the standard ABOX, these connection boxes require a plug-in bus terminator (M12) at the last station instead of the outgoing bus connection.

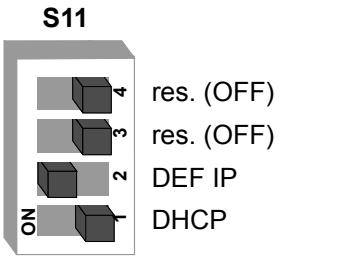
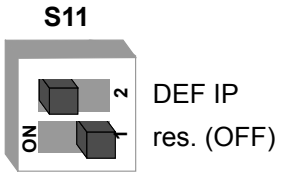
6.3.2 Startup with PROFINET IO, EtherNet/IP, or Modbus/TCP

1. Check the MOVIFIT® connection.

	TIP
	In conjunction with PROFINET IO, EtherNet/IP, or Modbus/TCP, you do not have to make any settings on the MOVIFIT® for fieldbus startup. The entire fieldbus startup is carried out via Software Tools and is described in the applicable manuals: • Manual for MOVIFIT® function level "Classic..."[1)] • "MOVIFIT® Function Level Technology..."[1)] manual

1) The "MOVIFIT® Function Level Classic" and "MOVIFIT® Function Level Technology" manuals are available in several fieldbus-specific versions.

2. To start up the MOVIFIT® inverter, see the section "Startup MOVIFIT® Frequency Inverter" (see page 104).
3. Set DIP switch S11/2 "DEFIP" to "ON".

DIP switch S11/2 = ON	
MOVIFIT® function level "Technology"	**MOVIFIT® function level "Classic"**
	

This sets the address parameters to the following default values:

IP address:	192.168.10.4
Subnet mask:	255.255.255.0
Gateway:	0.0.0.0

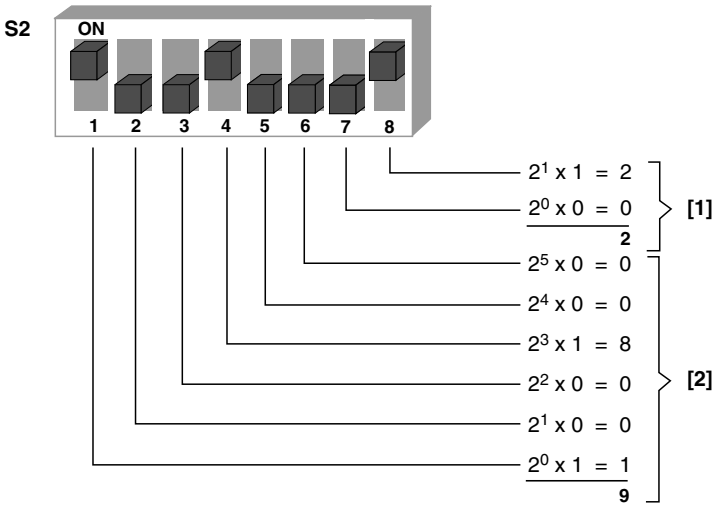
4. Mount the MOVIFIT®-EBOX on the ABOX and close it.
5. Switch on the 24V_C and 24V_S supply voltage(s). The associated control LEDs should now light up green.

6.3.3 Startup with DeviceNet

1. Check the MOVIFIT® connection.
2. Set the DeviceNet address at DIP switch S2 of the MOVIFIT®-ABOX.
3. Set the baud rate at DIP switch S2 of the MOVIFIT®-ABOX:
4. To start up the MOVIFIT® inverter, see the section "Startup MOVIFIT® Frequency Inverter" (see page 104).
5. Mount the MOVIFIT®-EBOX on the ABOX and close it.
6. Switch on the 24V_C and 24V_S supply voltage(s). The associated control LEDs should now light up green.

Setting DeviceNet address (MAC ID) and baud rate

The DeviceNet address is set using DIP switches S2/1 to S2/4. The baud rate is set using DIP switches S2/7 and S2/8.



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[1] Baud rate setting
[2] DeviceNet address setting

The following table uses address 9 as an example to show how to determine the DIP switch settings for any bus address.

DIP switch setting	Value
DIP S2/1 =ON	1
DIP S2/2 = OFF	2
DIP S2/3 = OFF	4
DIP S2/4 =ON	8
DIP S2/5 = OFF	16
DIP S2/6 = OFF	32

The following table shows how to set the baud rate using DIP switches S2/7 and S2/8:

Baud rate	Value	DIP S2/7	DIP S2/8
125 kbaud	0	OFF	OFF
250 kbaud	1	ON	OFF
500 kBaud	**2**	**OFF**	**ON**
(Reserved)	3	ON	ON

6.4 Startup MOVIFIT® frequency inverter

6.4.1 Startup mode

You can use one of the following startup modes to start up the MOVIFIT® frequency inverter:

- MOVIFIT®-FC can be put into operation quickly and easily in **"Easy"** mode using DIP switch S10 (see section "EBOX", page 13).

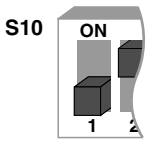
  To operate the unit in "**Expert**" mode, set DIP switch S10/1 to ON. This mode includes additional parameters. The parameters can be adjusted to suit the application using the "MOVITOOLS® MotionStudio" software tool (function levels "Classic" and "Technology").

	TIP
	Important: When you are using the "System" function level (MOVIVISION®), you must activate "Expert" mode (switch S10/1 = ON).

- After "Expert" mode is activated, the unit and its parameters are initialized only once according to the setting of DIP switches S10/2 to S10/6.
- When "Expert" mode is activated, DIP switches S10/2 to S10/6 are only re-effected when you set the *P802 Factory setting* parameter to "Delivery status". Otherwise, the system will ignore the changing of the DIP switch setting.

6.4.2 Startup in "Easy" mode

1. Set DIP switch S10/1 to "OFF", see section "EBOX" (on see page 13, Activating "Easy" mode).



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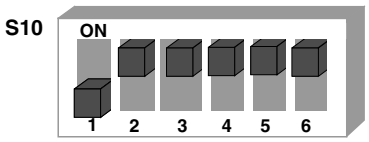
2. Set the unit parameters using DIP switches S10/2 to S10/6, see the following section "Description of DIP switches S10/2 to S10/6".

   You can now startup the following motors directly without making any further settings:

Description of DIP switches S10/2 to S10/6

In Easy mode, the unit parameters are set using the DIP switches S10/2 to S10/6. The following sections describe the setting options:



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S10 Meaning	1 Startup mode	2 Operating mode	3 Motor/brake type	4 Motor connection type	5 Motor power	6 Hoist
ON	Expert mode	V/f	Motor type 2/Option brake	Delta	One power rating lower	VFC/Hoist
OFF	Easy mode	VFC operation (only for 4-pole SEW motors)	Motor 1/ Standard brake	Star	Adjusted	S10/2 active

CAUTION

Set the DIP switches using suitable tools, e.g. a slotted screwdriver with a blade width smaller than 3 mm.

The force used for setting the DIP switches must not exceed 5 N.

DIP switch S10/2

Control modes

- DIP switch S10/2 = OFF: VFC operation for 4-pole motors
- DIP switch S10/2 = ON: V/f operation for other motors

DIP switch S10/3

Motor/brake type

- When you are using IEC or NEMA motors (DT/DV), DIP switch S10/3 must always be set to OFF.
- For DX/DZ motors with rated voltages of 220/380 V, 60 Hz (only available in Brazil), and for aseptic motors (DAS), DIP switch S10/3 must be set to ON.
- When you are using DR motors with MOVIFIT® standard brakes, DIP switch S10/3 must always be set to OFF.
- When you are using DR motors with option brakes, DIP switch S10/3 must always be set to ON.

DIP switch S10/4

Motor connection type

- DIP switch S10/4 = OFF: You must select this setting if the motor is operated in star connection (refer to the tables on the following pages).
- DIP switch S10/4 = ON: You must select this setting if the motor is operated in delta connection (refer to the tables on the following pages).

DIP switch S10/5 **Lower motor power rating**

- When activated, this DIP switch enables MOVIFIT® to be assigned to a motor with a lower power rating. The rated unit power is not affected.
- When a motor with a lower power rating is used, the overload capacity of the drive can be increased because, from the perspective of the motor, MOVIFIT® is one power rating too high. A higher current can be provided briefly, leading to higher torque ratings.
- The aim of switch S10/5 is to achieve short-term utilization of the motor's peak torque. The unit's current level remains the same regardless of the switch setting. Blocking protection for the motor is adjusted depending on the switch position.
- When DIP switch S10/5 is activated, the motor cannot be operated with stall protection.

DT / DV				V =	AC 3 x 400 V, 50 Hz			
MOVIFIT®	Assigned DT/DV motor and brake[1]							
	S10/5 = OFF				S10/5 = ON			
	⅄ connection		△ connection		⅄ connection		△ connection	
	Motor	Brake	Motor	Brake	Motor	Brake	Motor	Brake
MTF..003..00	DT71D4	BMG05	DR63L4	BR03	DR63L4	BR03	-	-
MTF..005..00	DT80K4	BMG1	DT71D4	BMG05	DT71D4	BMG05	DR63L4	BR03
MTF..007..00	DT80N4	BMG1	DT80K4	BMG1	DT80K4	BMG1	DT71D4	BMG05
MTF..011..00	DT90S4	BMG2	DT80N4	BMG1	DT80N4	BMG1	DT80K4	BMG1
MTF..015..00	DT90L4	BMG2	DT90S4	BMG2	DT90S4	BMG2	DT80N4	BMG1
MTF..022..00	DV100M4	BMG4	DT90L4	BMG2	DT90L4	BMG2	DT90S4	BMG2
MTF..030..00	DV100L4	BMG4	DV100M4	BMG4	DV100M4	BMG4	DT90L4	BMG2
MTF..040..00	DV112M4	BMG8	DV100L4	BMG4	DV100L4	BMG4	DV100M4	BMG4

DAS				V =	AC 3 x 400 V, 50 Hz			
MOVIFIT®	Assigned DAS motor and brake[2]							
	S10/5 = OFF				S10/5 = ON			
	⅄ connection		△ connection		⅄ connection		△ connection	
	Motor	Brake	Motor	Brake	Motor	Brake	Motor	Brake
MTF..003..01	DAS80N4	BR1	DAS80K4	BR1	DAS80K4	BR1	-	-
MTF..005..01	DAS90S4	BR2	DAS80N4	BR1	DAS80N4	BR1	DAS80K4	BR1
MTF..007..01	DAS90L4	BR2	DAS90S4	BR2	DAS90S4	BR2	DAS80N4	BR1
MTF..011..01	DAS100M4	BR2	DAS90L4	BR2	DAS90L4	BR2	DAS90S4	BR2
MTF..015..01	DAS100L4	BR2	DAS100M4	BR2	DAS100M4	BR2	DAS90L4	BR2
MTF..022..01	-	-	DAS100L4	BR2	DAS100L4	BR2	DAS100M4	BR2
MTF..030..01	-	-	-	-	-	-	DAS100L4	BR2
MTF..040..01	-	-	-	-	-	-	-	-

1) Possible brake voltages: 110 V, 230 V, 400 V

2) Possible brake voltages: BR1: 230 V, BR2: 230 V and 400 V

DRS							V =	AC 3 x 400 V, 50 Hz or AC 3 x 460 V, 60 Hz				
MOVIFIT®	Assigned DRS motor and brake[1]											
	S10/5 = OFF						S10/5 = ON					
	⅄ connection			△ connection			⅄ connection			△ connection		
	Motor	Brake		Motor	Brake		Motor	Brake		Motor	Brake	
		Standard	Option		Standard	Option		Standard	Option		Standard	Option
MTF..003..10 MTF..003..12	DRS71 S4	BE05	BE1	DR63 L4[2]	BR03	-	DR63 L4[2]	BR03	-	-	-	-
MTF..005..10 MTF..005..12	DRS71 M4	BE1	BE05	DRS71 S4	BE05	BE1	DRS71 S4	BE05	BE1	DR63 L4[2]	BR03	-
MTF..007..10 MTF..007..12	DRS80 S4	BE1	BE05	DRS71 M4	BE1	BE05	DRS71 M4	BE1	BE05	DRS71 S4	BE05	BE1
MTF..011..10 MTF..011..12	DRS80 M4	BE2	BE1	DRS80 S4	BE1	BE05	DRS80 S4	BE1	BE05	DRS71 M4	BE1	BE05
MTF..015..10 MTF..015..12	DRS90 M4	BE2	BE1	DRS80 M4	BE2	BE1	DRS80 M4	BE2	BE1	DRS80 S4	BE1	BE05
MTF..022..10 MTF..022..12	DRS90 L4	BE5	BE2	DRS90 M4	BE2	BE1	DRS90 M4	BE2	BE1	DRS80 M4	BE2	BE1
MTF..030..10 MTF..030..12	DRS100 M4	BE5	BE2	DRS90 L4	BE5	BE2	DRS90 L4	BE5	BE2	DRS90 M4	BE2	BE1
MTF..040..10 MTF..040..12	DRS100 LC4[2] L4[3]	BE5	BE2	DRS100 M4[2]	BE5[2]	BE2[2]	DRS100 M4	BE5	BE2	DRS90 L4	BE5	BE2

DRE							V =	AC 3 x 400 V, 50 Hz or AC 3 x 460 V, 60 Hz				
MOVIFIT®	Assigned DRE motor and brake[1]											
	S10/5 = OFF						S10/5 = ON					
	⅄ connection			△ connection			⅄ connection			△ connection		
	Motor	Brake		Motor	Brake		Motor	Brake		Motor	Brake	
		Standard	Option		Standard	Option		Standard	Option		Standard	Option
MTF..003..11 MTF..003..13	-	-	-	-	-	-	-	-	-	-	-	-
MTF..005..11 MTF..005..13	-	-	-	-	-	-	-	-	-	-	-	-
MTF..007..11 MTF..007..13	DRE80 M4	BE1	BE05	-	-	-	-	-	-	-	-	-
MTF..011..11 MTF..011..13	DRE90 M4	BE2	BE1	DRE80 M4	BE1	BE05	DRE80 M4	BE1	BE05	-	-	-
MTF..015..11 MTF..015..13	DRE90 L4	BE2	BE1	DRE90 M4	BE2	BE1	DRE90 M4	BE2	BE1	DRE80 M4	BE1	BE05
MTF..022..11 MTF..022..13	DRE100 M4 L4[2)3]	BE5	BE2	DRE90 L4	BE2	BE1	DRE90 L4	BE2	BE1	DRE90 M4	BE2	BE1
MTF..030..11 MTF..030..13	DRE100 LC4	BE5	BE2	DRE100 M4[2] L4[3]	BE5	BE2	DRE100 M4[2] L4[3]	BE5	BE2	DRE90 L4	BE2	BE1
MTF..040..11 MTF..040..13	DRE132 S4[2]	BE5	BE11	DRE100 LC4[2]	BE5[2]	BE2[2]	DRE100 LC4	BE5	BE2	DRE100 M4[2] L4[3]	BE5	BE2

1) Possible brake voltages: 120 V, 230 V, 400 V

2) For AC 3 x 400 V, 50 Hz only

3) For AC 3 x 460 V, 60 Hz only

DRP							V = AC 3 x 400 V, 50 Hz					
MOVIFIT®	Assigned DRP motor and brake[1]											
	S10/5 = OFF						S10/5 = ON					
	⅄ connection			△ connection			⅄ connection			△ connection		
	Motor	Brake		Motor	Brake		Motor	Brake		Motor	Brake	
		Standard	Option		Standard	Option		Standard	Option		Standard	Option
MTF..003..16	-	-	-	-	-	-	-	-	-	-	-	-
MTF..005..16	-	-	-	-	-	-	-	-	-	-	-	-
MTF..007..16	DRP90 M4	BE1	BE2	-	-	-	-	-	-	-	-	-
MTF..011..16	DRP90 L4	BE2	BE1	DRP90 M4	BE1	BE2	DRP90 M4	BE1	BE2	-	-	-
MTF..015..16	DRP100 M4	BE2	BE5	DRP90 L4	BE2	BE1	DRP90 L4	BE2	BE1	DRP90 M4	BE1	BE2
MTF..022..16	DRP100 L4	BE5	BE2	DRP100 M4	BE2	BE5	DRP100 M4	BE2	BE5	DRP90 L4	BE2	BE1
MTF..030..16	DRP112 M4	BE5	BE11	DRP100 L4	BE5	BE2	DRP100 L4	BE5	BE2	DRP100 M4	BE2	BE5
MTF..040..16	DRP132 M4	BE5	BE11	DRP112 M4	BE5	BE11	DRP112 M4	BE5	BE11	DRP100 L4	BE5	BE2

DRP							V = AC 3 x 460 V, 60 Hz					
MOVIFIT®	Assigned DRP motor and brake[1]											
	S10/5 = OFF						S10/5 = ON					
	⅄ connection			△ connection			⅄ connection			△ connection		
	Motor	Brake		Motor	Brake		Motor	Brake		Motor	Brake	
		Standard	Option		Standard	Option		Standard	Option		Standard	Option
MTF..003..17	-	-	-	-	-	-	-	-	-	-	-	-
MTF..005..17	-	-	-	-	-	-	-	-	-	-	-	-
MTF..007..17	DRP90 M4	BE1	BE2	-	-	-	-	-	-	-	-	-
MTF..011..17	DRP90 L4	BE2	BE1	DRP90 M4	BE1	BE2	DRP90 M4	BE1	BE2	-	-	-
MTF..015..17	DRP90 L4	BE2	BE1	DRP90 L4	BE2	BE1	DRP90 L4	BE2	BE1	DRP90 M4	BE1	BE2
MTF..022..17	DRP112 M4	BE5	BE11	DRP90 L4	BE2	BE1	DRP90 L4	BE2	BE1	DRP90 L4	BE2	BE1
MTF..030..17	DRP132 S4	BE5	BE11	DRP112 M4	BE5	BE11	DRP112 M4	BE5	BE11	DRP90 L4	BE2	BE1
MTF..040..17	-	-	-	-	-	-	DRP132 S4	BE5	BE11	DRP112 M4	BE5	BE11

1) Possible brake voltages: 120 V, 230 V, 400 V

TIP

The type of connected brake can be found on the nameplate of the motor.

The braking torque of the brake can be found in the section titled "Braking torques" (see page 139).

DIP switch S10/6 **Hoist application**

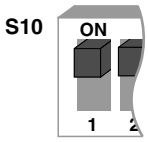
- DIP switch S10/6 = OFF: The operating mode is selected according to DIP switch S10/2.
- DIP switch S10/6 = ON: You must make this setting when MOVIFIT® is to be used in a hoist application. The control mode is VFC mode for the hoist and 4-pole SEW motors.

6.4.3 Startup of MOVIFIT® drive with constant voltage brake

	TIP
	• When connecting a MOVIFIT® drive that has a constant voltage brake, note the specific terminal assignment for connecting the brake as specified in section "Fieldbus/option-independent terminal assignment" (see page 49). • For tips on starting up the MOVIFIT® drive with a constant voltage brake, refer to the "MOVIFIT® Function Level Technology..." manual.

6.4.4 Advanced startup and parameter settings in "Expert" mode

1. Set DIP switch S10/1 to "ON", see section "EBOX" (on see page 13, Activating "Expert" mode).



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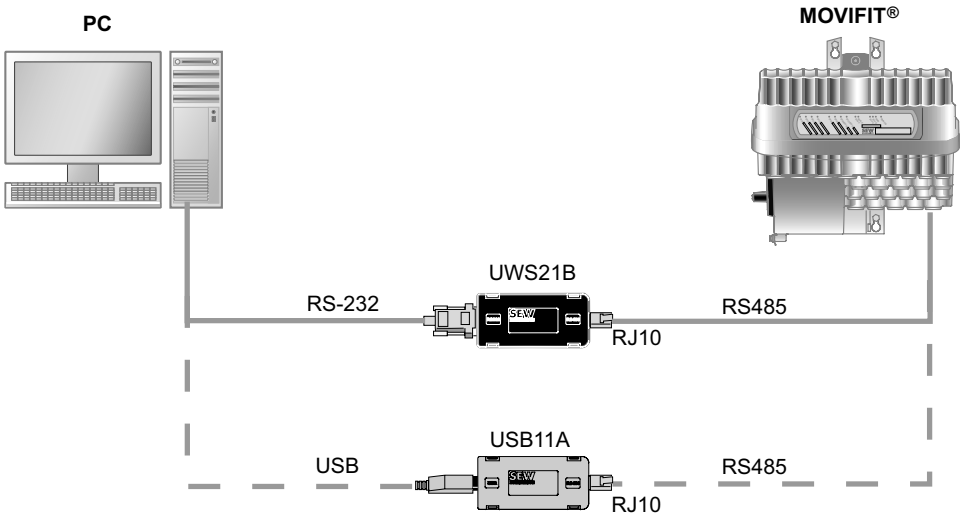
2. Connect MOVIFIT® to your PC or laptop:



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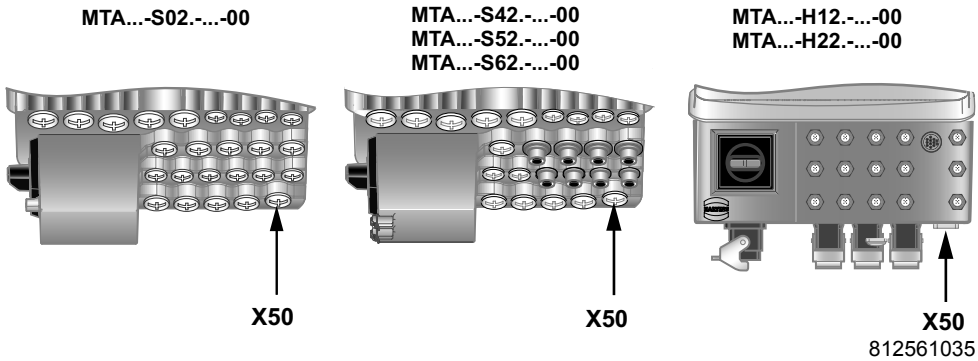
Connect USAB11A or UWS21B to MOVIFIT® via the X50 diagnostics socket. The diagnostics socket is located under the cable gland shown in the following figure:



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3. The remaining procedure for startup/parameter setting in "Expert" mode differs depending on the fieldbus and selected MOVIFIT® function level. See the following manuals for more information:
   - MOVIFIT® function level "Classic"..[1)]
   - MOVIFIT® function level "Technology" ..[1)]
   - MOVIFIT® function level "System"

1) The "MOVIFIT® Function Level Classic" and "MOVIFIT® Function Level Technology" manuals are available in several fieldbus-specific versions.

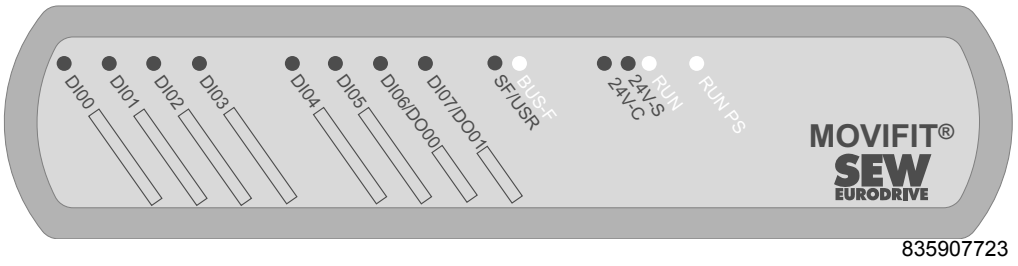
7 Operation

7.1 Status LEDs for MOVIFIT®-FC

7.1.1 General LEDs

This section describes the fieldbus- and option-independent LEDs. These LEDs are shown as dark in the figures. The LEDs that are shown to be white differ depending on which fieldbus version is used. They are described in the following sections. The following figures show examples of the PROFIBUS variants:

Function level "Classic" with PROFIBUS or DeviceNet



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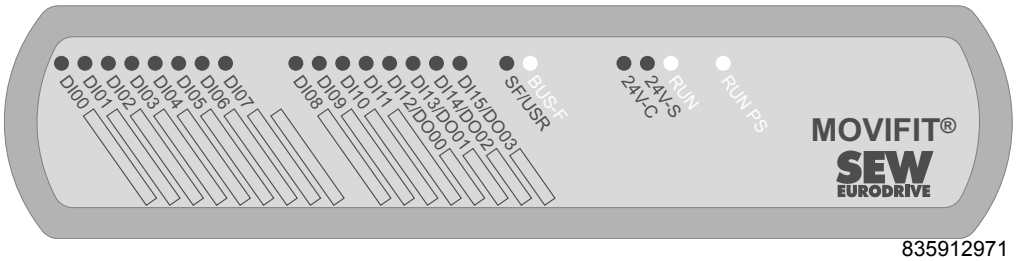
Function level "Technology" or "System" with PROFIBUS, DeviceNet, or PROFINET
Function level "Classic" with PROFINET



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LEDs "DI.." and "DO.."

The following table shows the statuses of the LEDs "DI.." and "DO..":

LED	Status	Meaning
DI00 to DI15	**Yellow**	Input signal present at binary input DI.. present
	Off	Input signal at binary input DI.. open or "0".
DO00 to DO03	**Yellow**	Switched DO.. output.
	Off	DO.. output logical "0"

"24V-C" and "24V-S" LEDs

The following table shows the statuses of the "24V-C" and "24V-S" LEDs:

LED	Status	Meaning	Remedy
24V-C	**Green**	24V_C continuous voltage is present.	-
	Off	24V_C continuous voltage is missing.	Check 24V_C voltage supply.
24V-S	**Green**	24V_S actuator voltage is present.	-
	Off	24V_S actuator voltage is missing.	Check 24V_S voltage supply.

"SF/USR" LED

The "SF/USR" LED indicates the various statuses depending on the function level.

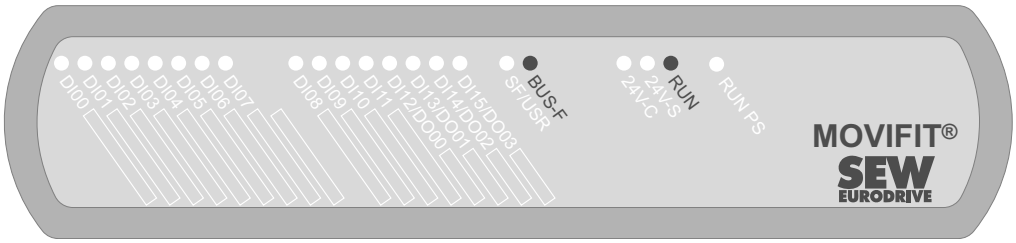
The following table shows the statuses of the "SF/USR" LED:

SF/USR	Function level			Meaning	Remedy
	C	T	S		
Off	•			Standard operating state: MOVIFIT® exchanges data with the connected drive system (integrated inverter).	-
Red	•			MOVIFIT® cannot exchange data with an integrated inverter.	Check the DC 24 V supply of the integrated inverter.
Flashing red (2 s cycle)	•			MOVIFIT® initialization error or serious unit fault	Incorrect card ID Switch on MOVIFIT® again. If the fault is still present, replace the EBOX or contact SEW Service.
Flashing red	•			Other unit faults	Use MOVITOOLS® MotionStudio to read out the fault status. Remedy the cause of and acknowledge the fault.
Off		•		IEC program is running.	-
Green		•		IEC program is running. The IEC program controls the green LED.	For the meaning, see the IEC program documentation.
Red		•		Due to an error, boot project was cancelled or did not start.	Use MOVITOOL®/PLC Editor/Remote Tool to log on; start the boot project.
		•		MOVIFIT® initialization fault Incorrect EBOX/ABOX combination	Incorrect card ID Check the type of MOVIFIT®-EBOX. Place the correct EBOX in the ABOX and perform the complete startup process.
Flashing red		•		No IEC application program loaded	Load an IEC application program and, if necessary, restart the integrated PLC.
Flashing yellow		•		The IEC application program has been loaded, but it is not running (PLC = Stop).	Check the IEC application program using MOVITOOLS® MotionStudio and, if necessary, restart the integrated PLC.
Flashing 1 x red and n x green		•		Fault status reported by the IEC program	For status/rectification, see the IEC program documentation.
Red			•	MOVIFIT® displays a fault status.	Eliminate the cause of the fault and use PROFIBUS to acknowledge the fault message. Use MOVIVISION® for detailed fault diagnostics.
Flashing red			•	MOVIFIT® indicates a fault status; cause of fault has already been eliminated.	Use PROFIBUS to acknowledge the fault message. Use MOVIVISION® for detailed fault diagnostics.

- Valid for selected function level:
  C = Function level "Classic"
  T = Function level "Technology"
  S = Function level "System"

7.1.2 Bus-specific LEDs for PROFIBUS

This section describes the bus-specific LEDs for PROFIBUS. In the following figure, the LEDs are shown as dark:



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"BUS-F" LED

The following table shows the statuses of the "BUS-F" LED:

BUS-F	RUN	Meaning	Remedy
Off	Green	MOVIFIT® is currently exchanging data with the DP master (data exchange).	-
Flashing red	Green	• The baud rate is detected. However, MOVIFIT® is not being addressed by the DP master. • MOVIFIT® was configured incorrectly or not configured in DP master.	• Check configuration of the DP master. • Check whether all the modules configured during project planning are permitted for the MOVIFIT® variants (MC, FC, and SC).
Red	Green	• Connection to the DP master has failed. • MOVIFIT® does not detect baud rate. • Bus interruption • DP master not in operation	• Check the PROFIBUS DP connection of MOVIFIT®. • Check the DP master. • Check all cables in your PROFIBUS DP network.

"RUN" LED

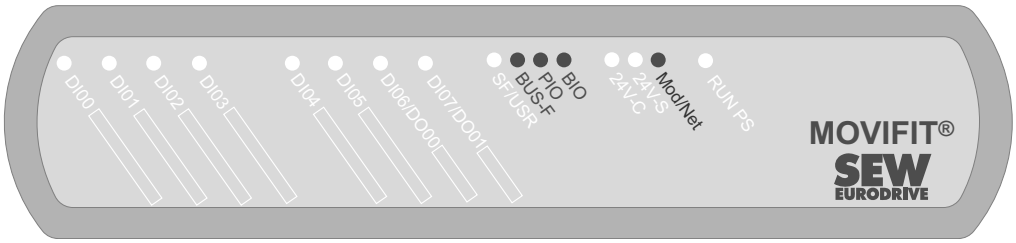
The following table shows the statuses of the "RUN" LED:

BUS-F	RUN	Meaning	Remedy
x	**Off**	• MOVIFIT® not ready for operation • No 24 V power supply	• Check DC 24 V supply. • Switch on MOVIFIT® again. Exchange EBOX if problem occurs repeatedly.
x	**Green**	MOVIFIT® components hardware OK	-
Off	**Green**	• MOVIFIT® operating correctly. • MOVIFIT® is currently exchanging data with the DP master (data exchange) and all subordinate drive systems.	-
x	**Flashing green**	PROFIBUS address is set equal to 0 or higher than 125.	Check the PROFIBUS address set in the MOVIFIT®-ABOX.
x	**Yellow**	MOVIFIT® is currently being initialized.	-
x	**Red**	Internal unit fault	Switch on MOVIFIT® again. Exchange EBOX if problem occurs repeatedly.

X Any status

7.1.3 Bus-specific LEDs for DeviceNet

This section describes the bus-specific LEDs for DeviceNet. In the following figure, the LEDs are shown as dark:



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"Mod/Net" LED

The function of the "Mod/Net" LED described in the following table is specified in the DeviceNet specification.

Mod/Net	Status	Meaning	Remedy
Off	Not switched on / off-line	• Unit is offline. • Unit performs DUP MAC check. • Unit is switched off.	• Apply supply voltage via DeviceNet connector.
Flashing green (1 s cycle)	Online and in operational mode	• The unit is online and no connection has been established. • DUP-MAC check performed successfully • A connection to a master has not yet been established. • Missing (incorrect) or incomplete configuration	• Include the station in the master's scan list and start communication in the master.
Green	Online, operational mode and connected	• Unit is online. • Connection is active (established state).	-
Flashing red (1 s cycle)	Minor fault or connection timeout	• A correctable fault has occurred. • Polled I/O and/or bit-strobe I/O connections are in the timeout status. • A correctable fault has occurred in the unit.	• Check the DeviceNet cable. • Check the timeout response (P831). If a response with fault is set, reset the unit once the fault has been corrected.
Red	Critical fault or critical link failure	• A fault that cannot be corrected has occurred. • Bus off status • DUP-MAC check has detected a fault.	• Check the DeviceNet cable. • Check the slave address (MAC ID). Is another unit already using the same address?

"PIO" LED

The "PIO" LED checks the polled I/O connection (process data channel).

The functionality is described in the following table.

PIO	Status	Meaning	Remedy
Flashing green (500 ms cycle)	DUP-MAC check	• Unit is performing DUP-MAC check. • If the station does not leave this status after about 2 seconds, it means that no further stations were found.	• Activate at least one other DeviceNet station in the network.
Off	Not switched on/Offline but not DUP-MAC check	• Unit is switched off. • Unit is in offline status.	• Switch on the unit. • Check whether the PIO connection type in the master was activated.
Flashing green (1 s cycle)	Online and in operational mode	• Unit is online. • DUP-MAC check performed successfully • A PIO connection is being established with a master (configuring state). • Missing, incorrect or incomplete configuration	• Check the unit configuration in the master.
Green	Online, operational mode and connected	• Unit is online. • A PIO connection has been established (established state).	-
Flashing red (1 s cycle)	Minor fault or connection timeout	• A correctable fault has occurred. • Invalid baud rate set at the DIP switches. • Polled I/O connection is in timeout status.	• Check the DeviceNet cable. • Check the position of DIP switches for the baud rate. • Check the timeout response (P831). If a response with fault is set, reset the unit once the fault has been corrected.
Red	Critical fault or Critical link failure	• A fault that cannot be corrected has occurred. • Bus off status • DUP-MAC check has detected a fault.	• Check the DeviceNet cable. • Check the slave address (MAC ID). Is another unit already using the same address?

"BIO" LED

The "BIO" LED checks the bit-strobe I/O connection.

The functionality is described in the following table.

BIO	Status	Meaning	Remedy
Flashing green (500 ms cycle)	DUP-MAC check	• Unit is performing DUP-MAC check. • If the station does not leave this status after about 2 seconds, it means that no further stations were found.	• Activate at least one other DeviceNet station in the network.
Off	Not switched on/but not offline DUP-MAC check	• Unit is switched off. • Unit is in offline status.	• Switch on the unit. • Check whether the BIO connection type in the master was activated.
Flashing green (1 s cycle)	Online and in operational mode	• Unit is online. • DUP-MAC check performed successfully • A BIO connection is being established with a master (configuring state). • Missing, incorrect or incomplete configuration	• Check the unit configuration in the master.
Green	Online, operational mode and connected	• Unit is online. • A BIO connection has been established (established state).	-
Flashing red (1 s cycle)	Minor fault or connection timeout	• A correctable fault has occurred. • Bit-strobe I/O connection is in timeout state.	• Check the DeviceNet cable. • Check the timeout response (P831). If a response with fault is set, reset the unit once the fault has been corrected.
Red	Critical fault or Critical link failure	• A fault that cannot be corrected has occurred. • Bus off status • DUP-MAC check has detected a fault.	• Check the DeviceNet cable. • Check the slave address (MAC ID). Is another unit already using the same address?

"BUS-F" LED

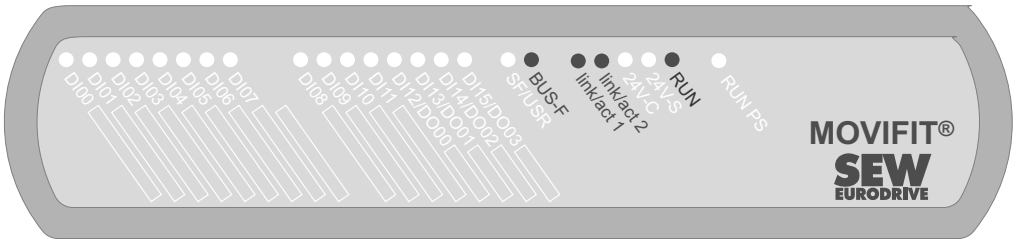
The "BUS-F" LED indicates the physical status of the bus node.

The functionality is described in the following table:

BUS-F	Status	Meaning	Remedy
Off	No error	• The number of bus errors is within the normal range (error active state).	-
Flashing red (1 s cycle)	Bus warning	• The unit is performing a DUP-MAC check and cannot send any messages because no other participants are connected to the bus (error passive state).	• Activate one other DeviceNet station in the network. • Check the wiring and terminating resistors.
Red	Bus error	• Bus off status • The number of physical bus errors has increased despite a switch to the error-passive state. Access to the bus is deactivated.	• Check the setting for the address baud rate, wiring, and terminating resistors.
Yellow	Power Off	• External voltage supply has been turned off or is not connected.	• Check the external voltage supply and wiring of the unit.

7.1.4 Bus-specific LEDs for PROFINET

This section describes the bus-specific LEDs for PROFINET. In the following figure, the LEDs are shown as dark:



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"RUN" LED

The following table shows the statuses of the "RUN" LED:

RUN	BUS-F	Meaning	Remedy
Green	x	MOVIFIT® components hardware OK	-
Green	Off	• Correct MOVIFIT® operation • MOVIFIT® is currently exchanging data with the PROFINET master (data exchange) and all lower-level drive systems.	-
Off	x	• MOVIFIT® not ready for operation • No 24 V power supply	• Check DC 24 V supply. • Switch on MOVIFIT® again. Exchange EBOX if problem occurs repeatedly.
Red	x	Fault in MOVIFIT® components hardware	Switch on MOVIFIT® again. Exchange EBOX if problem occurs repeatedly.
Flashing green	x	MOVIFIT® components hardware cannot start.	Switch on MOVIFIT® again. Exchange EBOX if problem occurs repeatedly.
Flashing yellow	x	MOVIFIT® components hardware cannot start.	Switch on MOVIFIT® again. Exchange EBOX if problem occurs repeatedly.
Yellow	x	MOVIFIT® components hardware cannot start.	Switch on MOVIFIT® again. Exchange EBOX if problem occurs repeatedly.

X Any status

"BUS-F" LED

The following table shows the statuses of the "BUS-F" LED:

RUN	BUS-F	Meaning	Remedy
Green	**Off**	MOVIFIT® is currently exchanging data with the PROFINET master (data exchange).	-
Green	**Flashing green, flashing green/ red**	The flashing function in the PROFINET master configuration is activated to visually localize the stations.	-
Green	**Red**	• Connection to the PROFINET master has failed. • MOVIFIT® does not detect a link. • Bus interruption • PROFINET master not in operation.	• Check the PROFINET connection of MOVIFIT®. • Check the PROFINET master. • Check all cables in your PROFINET mains.

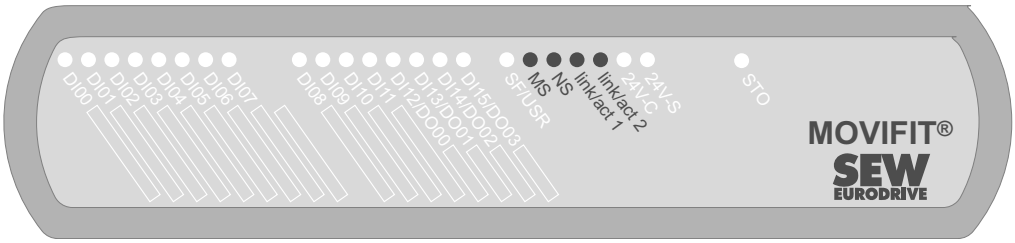
"link/act 1" and "link/act 2" LEDs

The following table shows the statuses of the "link/act 1" and "link/act 2" LEDs:

LED	Status	Meaning
link/act 1	Ethernet port 1 link = green act = yellow	• link = Ethernet cable connects device with other Ethernet stations. • act = active, Ethernet communication active
link/act 2	Ethernet port 2 link = green act = yellow	

7.1.5 Bus-specific LEDs for Modbus/TCP and EtherNet/IP

This section describes the bus-specific LEDs for Modbus/TCP and EtherNet/IP. In the following figure, the LEDs are shown as dark:



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"MS" and "NS" LEDs

The following table shows the statuses of LEDs "MS" (module status) and "NS" (network status):

MS	NS	Meaning	Remedy
Off		• MOVIFIT® not ready for operation • No DC 24 V supply	• Check DC 24 V supply. • Switch on MOVIFIT® again. • Exchange EBOX if problem occurs repeatedly.
Flashing red / green		• MOVIFIT® performs an LED test. • This status may only be active for a short time at startup.	-
Flashing red	Red	• A conflict has been detected in the IP address assignment. Another station in the network uses the same IP address.	• Check whether there is a unit in the network with the same IP address. • Change the MOVIFIT® IP address. • Check the DHCP settings for IP address assignment of the DHCP server. (Do this only if you are using a DHCP server.)
Red	x	Fault in MOVIFIT® components hardware	• Switch on MOVIFIT® again. • Reset MOVIFIT® to the factory settings. • Exchange EBOX if problem occurs repeatedly.
Flashing green	Flashing green	Start application	-
Flashing green	Off	• MOVIFIT® does not yet have any IP parameters. • The TCP IP stack is starting. • If the status continues and the DHCP DIP switch is activated, MOVIFIT® is waiting for data from the DCHP server.	• Set DIP switch S11/1 of the DHCP server to "OFF". • Check the DHCP server connection (only if DHCP is activated and the status continues).
Green	x	MOVIFIT® components hardware OK	-
x	**Flashing red**	• The timeout delay of the controlling connection has elapsed. • The status can be reset by restarting the communication.	• Check the bus connection of MOVIFIT®. • Check the master/scanner. • Check all cables in the Ethernet.
x	**Flashing green**	• There is no controlling connection.	-
x	**Green**	• There is a controlling connection with a master/scanner.	-

X Any status

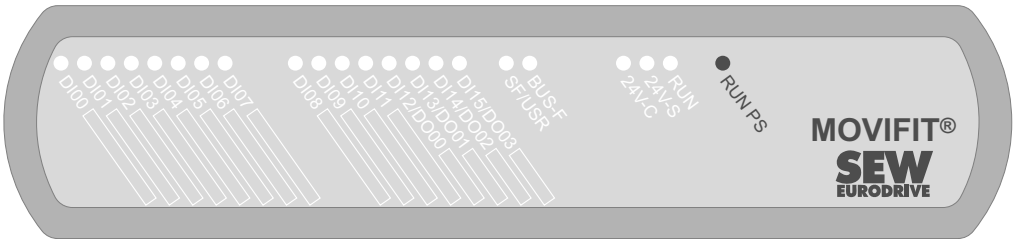
"link/act 1" and "link/act 2" LEDs

The following table shows the statuses of the "link/act 1" and "link/act 2" LEDs:

LED	Status	Meaning
link/act 1	Ethernet port 1 link = green act = yellow	• link = Ethernet cable connects device with other Ethernet stations. • act = active, Ethernet communication active
link/act 2	Ethernet port 2 link = green act = yellow	

7.1.6 "RUN PS" LED (frequency inverter status LED)

The following figure shows the "RUN PS" LED (shown unlit). In the sample figure, the PROFIBUS versions are shown in the "Technology" or "System" function level:



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LED color	LED status	Operating state	Description
-	**Off**	Not ready	No 24 V power supply
Yellow	**Flashing steadily**	Not ready	Self-test phase is active or 24 V supply is present but the mains voltage is not OK.
Yellow	**Flashing evenly, fast**	Ready for operation	Brake release without drive enable is active.
Yellow	**Constantly lit**	Ready, but unit inhibited	24 V power supply and supply voltage OK, but no enable signal.
Green/ yellow	**Flashing with alternating colors**	Ready, but timeout	Faulty communication with cyclical data exchange
Green	**Constantly lit**	Unit enabled	Motor in operation
Green	**Flashing evenly, fast**	Current limit active	Drive operating at current limit.
Green	**Flashing steadily**	Ready for operation	Standstill current function active
Red	**Constantly lit**	Not ready	Check 24 V supply. Make sure that a smoothed DC voltage with low ripple is present (residual ripple max. 13 %).
Red	**2x flashing, break**	Fault 07	DC link voltage too high.
Red	**Flashing slowly**	Fault 08	Speed monitoring error
		Fault 09	Incorrect startup/parameter settings
		Fault 90	Incorrect assignment of motor to inverter Invalid DIP switch settings
		Fault 15	24 V supply voltage too low
		Faults 17-24, 37	CPU fault
		Fault 25	EEPROM fault
		Fault 26	Fault at external terminal (only at slave unit)
		Fault 94	Checksum error
		Fault 97	Copy error
Red	**3x flashing, break**	Fault 01	Overcurrent in output stage
		Fault 11	Overtemperature in output stage
Red	**4x flashing, break**	Fault 84	Overload in motor
		Fault 31	TF was triggered.
Red	**5x flashing, break**	Fault 89	Overtemperature in brake Incorrect assignment of motor-frequency inverter
		Fault 4	Overcurrent in brake chopper
Red	**6x flashing, break**	Fault 06	Mains phase failure
		Fault 81	Start condition (only in hoist operation mode)
		Fault 82	Open output

7.1.7 Option-specific LEDs

PROFIsafe option S11

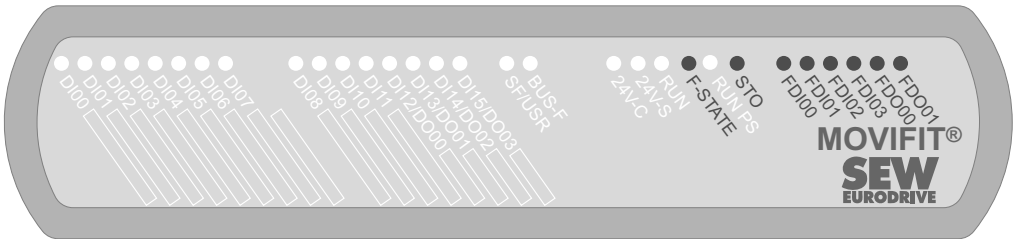
DANGER

If you are using PROFIsafe option S11, you must observe the SEW publication "Safe Disconnection for MOVIFIT®".

Severe or fatal injuries

- Note additional diagnostic and operating notes when using PROFIsafe option S11 in the SEW publication "Safe Disconnection for MOVIFIT®".

This section describes the option-specific LEDs for PROFIsafe option S11. In the following figure, these LEDs are shown as dark. In the sample figure, the PROFIBUS versions are shown in the "Technology" or "System" function level:



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LEDs "FDI." and "FDO."

The following table shows the statuses of the "FDI." and "FDO." LEDs:

LED	Status	Meaning
FDI0	**Yellow**	HIGH level on input F-DI0
	Off	LOW level on input F-DI0 or open
FDI1	**Yellow**	HIGH level on input F-DI1
	Off	LOW level on input F-DI1 or open
FDI2	**Yellow**	HIGH level on input F-DI2
	Off	LOW level on input F-DI2 or open
FDI3	**Yellow**	HIGH level on input F-DI3
	Off	LOW level on input F-DI3 or open
FDO0	**Yellow**	Output F-DO0 active
	Off	Output F-DO0 inactive (switched off)
FDO1	**Yellow**	Output F-DO1 active
	Off	Output F-DO1 inactive (switched off)

"STO" LED

The following table shows the statuses of the "STO" LED:

LED	Status	Meaning
STO	**Yellow**	• Drive has stopped safely ("STO active").
	Off	• Drive has not stopped safely ("STO inactive").

"F-STATE" LED

The following table shows the statuses of the "F-STATE" LED:

LED	Status	Meaning	Remedy
F-STATE	**Green**	• Option S11 is currently performing a cyclical data exchange with the F-Host. • Standard operating state:	-
	Red	• Fault status in the safety part • 24V_O supply voltage not available	• Read diagnostic in F-Host. • Eliminate the cause of the fault and acknowledge the fault in the F-Host.
	Off	• S11 option is currently in the initialization phase. • S11 option is not available or is not configured in the bus master (slot 1 is empty).	• Check voltage supply. • Check configuration of the bus master.
	Flashing red/ green	A fault occurred in the safety part; cause of the fault already remedied – acknowledgement required.	Acknowledge fault in the F-Host (reintegration).

⚠ WARNING

Incorrect interpretation of the "FDI.", "FDO.", "STO", and "F-STATE" LEDs

Severe or fatal injuries

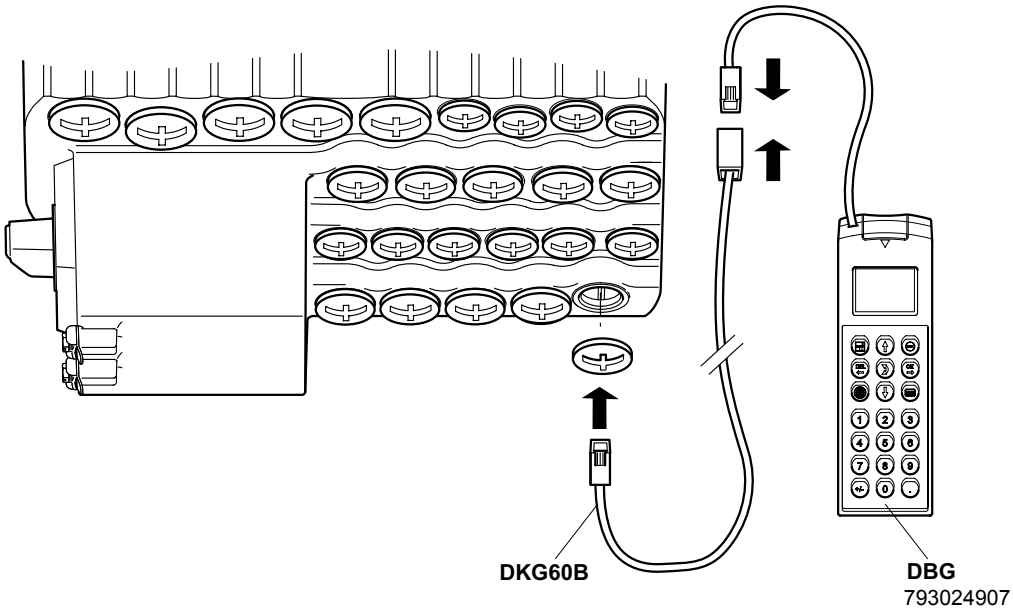
- The LEDs are not safety-oriented and may not be used as a safety device.

7.2 Manual operation using the DBG keypad

7.2.1 Connection

MOVIFIT® units have an X50 (RJ10 plug connector) diagnostic interface for parameter setting and manual operation.

The X50 diagnostic interface is located under the cable gland shown in the following figure:



⚠ WARNING

The surfaces of MOVIFIT® and of the external options, for example, the braking resistor, can reach high temperatures during operation.

Danger of burns

- Do not touch MOVIFIT® or the external options until they have cooled down sufficiently.

You can also connect the DBG keypad to the MOVIFIT® unit using option DKG60B (5 m extension cable).

NOTICE

The degree of protection specified in section Technical Data only applies if the screw plug of the diagnostic interface is mounted correctly.

A missing or incorrectly installed screw plug can cause damage to MOVIFIT®.

- Make sure the screw plug has a seal after manual operation and then screw in the plug.

7.2.2 Operation

TIP

For notes on operating MOVIFIT® in manual operation, refer to the "MOVIFIT® Function Level "Technology"..." or "MOVIFIT® Function Level "Classic"..." manual.

8 Service

8.1 Unit diagnostics

	TIP
	Depending on the function level in use, further diagnostic tools are available via MOVITOOLS® MotionStudio or MOVIVISION®. These are described in the respective manuals. • Manual for MOVIFIT® function level "Classic"...[1)] • "MOVIFIT® Function Level "Technology"..."[1)] manual • Manual for MOVIFIT® function level "System"

1) The "MOVIFIT® Function Level Classic" and "MOVIFIT® Function Level Technology" manuals are available in several fieldbus-specific versions.

8.2 Fault table

Fault	Cause / solution
Communication timeout (motor stops)	Incorrect type (cyclical) in acyclical data transfer, protocol time between the individual telegrams is higher than the set time (timeout time). Check the number of MOVIFIT®-FC units connected to the master (a maximum of 8 MOVIFIT®-FC units can be connected as slaves for cyclical communication). Reduce telegram cycle or select telegram type "acyclic".
DC link voltage too low, supply system off was detected (motor stops, without fault code)	Check supply system cables, supply voltage, and 24 V electronics supply voltage for interruption. Check the value of the 24 V electronics supply voltage (permissible voltage range 24 V ± 25%, EN 61131-2 residual ripple max. 13%). Motor restarts automatically as soon as the voltage reaches normal values.
Fault code 01 **Overcurrent in output stage**	Short circuit on inverter output Check the connection between the inverter output and the motor as well as the motor winding for short circuits. Reset the fault by switching off the DC 24 V supply voltage or using communication.
Fault code 06 **Phase failure** (The fault can be detected only when the drive is loaded.)	Check the supply system cables for phase failure. Reset the fault by switching off the DC 24 V supply voltage or using communication.
Fault code 07 **DC link voltage too high**	Ramp time too short → Increase ramp time. B Faulty connection between brake coil and braking resistor → Check the connection between braking resistor and brake coil and correct it, if necessary. C Incorrect internal resistance brake coil/braking resistor → Check the internal resistance of the brake coil/braking resistor (see sec. "Technical Data"). D Thermal overload in braking resistor → Wrong size of braking resistor selected E Invalid voltage range of the mains voltage → check mains voltage. Check at valid voltage range. Reset the fault by switching off the DC 24 V supply voltage or using communication.
Fault code 08 **Speed monitoring**	If speed monitoring was triggered, the load on the drive is too high → Reduce the drive load. → Increase the n-monitoring delay time. Reset the fault by switching off the DC 24 V supply voltage or using communication.
Fault code 09 **Startup**	Incorrect startup/parameter settings (e.g. with MOVITOOLS® MotionStudio) → Repeat startup with correct settings. Reset the fault by switching off the DC 24 V supply voltage or using communication.
Fault code 11 **Thermal overload of the output stage or internal unit error**	• Lower the ambient temperature. • Prevent heat build-up. • Reduce the load on the drive. Reset the fault by switching off the DC 24 V supply voltage or using communication.
Fault code 15 **24 V supply**	Supply voltages 24V_C and/or 24V_P are too low. Check 24 V supply voltages 24V_C and/or 24V_P. Reset the fault by switching off the DC 24 V supply voltage or using the communication.
Fault codes 17 to 24, 37 **CPU fault**	Reset the fault by switching off the DC 24 V supply voltage or using communication.

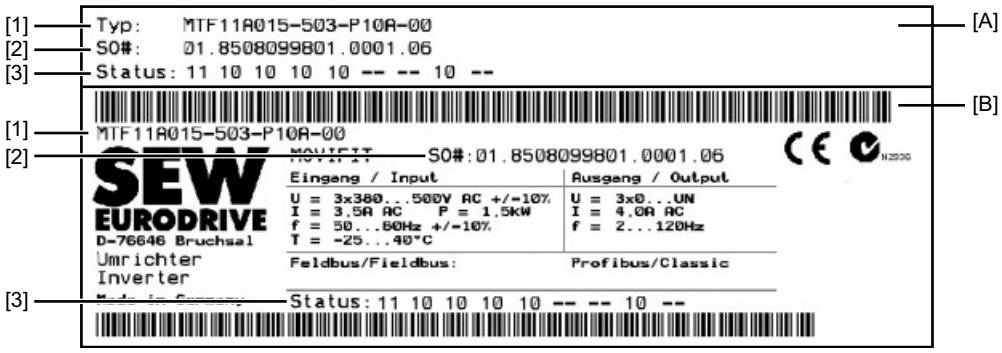
Fault	Cause / solution
Fault code 25 **EEPROM fault**	Fault when accessing EEPROM → Use parameter *P802* to set the delivery status. → Reset the fault by switching off the DC 24 V supply voltage. → Reset the unit parameters. Consult SEW Service if the fault continues to occur.
Fault code 26 **External terminal**	Low signal on the terminal that was programmed with the "/External fault" function (only with SBUS slave).
Fault codes 81, 82 **Start condition/output open**	Check the motor lead for phase failure. Reset the fault by switching off the DC 24 V supply voltage or using communication.
Fault codes 4, 84 **Thermal overload of motor**	• Lower the ambient temperature. • Prevent heat build-up. • Reduce the load on the motor. • Increase the speed. Reset the fault by switching off the DC 24 V supply voltage or using communication.
Fault code 89 **Thermal overload of brake coil or brake coil defective, brake coil connected incorrectly**	• Increase the set ramp time. • Brake inspection (see the motor operating instructions) • Check the brake coil connection. • Contact SEW Service. • If the fault is signaled shortly after the first enable, check the combination of the drive (brake coil) and MOVIFIT®-FC frequency inverter. • For combinations of "MOVIFIT®-FC" and "motors with one power rating lower," check the setting of DIP switch S10/5. Reset the fault by switching off the DC 24 V supply voltage or using communication.
Fault code 90 **Output stage detection**	Incorrect assignment of motor/inverter; Invalid DIP switch setting → Correct the DIP switch settings. Reset the fault by switching off the DC 24 V supply voltage or using communication.
Fault code 94 **EEPROM fault**	Defective EEPROM → Contact SEW Service.
Fault code 97 **Copy error**	Error during data transmission • Repeat copying process. • Set the delivery status and reset the unit parameters.

8.3 SEW electronics service

If a fault cannot be solved, please contact SEW-EURODRIVE Service (see the section "Address List").

When you contact SEW service, always provide the following information:

- Unit designation [1]
- Serial number [2]
- Digits in the status field [3]
- Brief description of the application
- Nature of the fault
- Accompanying circumstances (e.g. initial startup)
- Your own presumptions as to what has happened
- Any unusual events preceding the problem, etc.



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[A] External nameplate
[B] Internal nameplate
[1] Unit designation
[2] Serial number
[3] Status field

8.4 Disposal

This product consists of:

- Iron
- Aluminum
- Copper
- Plastic
- Electronic components

Dispose of all components in accordance with applicable regulations!

8.5 Long-term storage

If the unit is being stored for a long time, connect it to the mains voltage for at least 5 minutes every 2 years. Otherwise, the unit's service life may be reduced.

8.5.1 Procedure when maintenance has been neglected

Electrolytic capacitors are used in the inverters. The capacitors are subject to aging effects when deenergized. This effect can damage the capacitors if the unit is connected directly to the rated voltage after a longer period of storage. If you have not performed maintenance regularly, SEW-EURODRIVE recommends that you increase the supply voltage slowly up to the maximum voltage. This can be done, for example, by using a variable transformer for which the output voltage has been set according to the following overview. After you have completed the regeneration process, the unit can be used immediately or stored again for an extended period with maintenance.

The following stages are recommended:

AC 400/500 V units:

- Stage 1: AC 0 V to AC 350 V within a few seconds
- Stage 2: AC 350 V for 15 minutes
- Stage 3: AC 420 V for 15 minutes
- Stage 4: AC 500 V for 1 hour

9 Technical Data

9.1 CE marking, UL approval, and C-Tick

9.1.1 CE marking

- Low voltage directive:

  The MOVIFIT® drive system complies with the regulations of the low voltage directive 2006/95/EC.

- Electromagnetic compatibility (EMC):

  MOVIFIT®-FC units are designed for use as components for installation in machinery and systems. They comply with the EMC product standard EN 61800-3 "Variable-speed electrical drives". Provided the installation instructions are complied with, the CE marking requirements for the entire machine/system in which they are installed are satisfied on the basis of the EMC directive 2004/108/EEC. For detailed information on EMC-compliant installation, refer to the publication "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.

CE

The CE mark on the nameplate indicates conformity with the Low Voltage Directive 2006/95/EC and the EMC Directive 2004/108/EC. We can provide a declaration of conformity on request.

9.1.2 UL approval

c UL us

UL and cUL approval has been granted for the MOVIFIT®-FC unit series.

9.1.3 C-Tick

C-Tick approval has been granted for the MOVIFIT® unit series. C-Tick certifies conformity with ACA (Australian Communications Authority) standards.

9.2 Version with operating point 400 V/50 Hz

MOVIFIT® unit type		MTF11A 003-503	MTF11A 005-503	MTF11A 007-503	MTF11A 011-503	MTF11A 015-503	MTF11A 022-503	MTF11A 030-503	MTF11A 040-503
		Size 1					Size 2		
Apparent output power at V_{Mains} = AC 380-500 V	S_{Rated}	1.1 kVA	1.4 kVA	1.8 kVA	2.2 kVA	2.8 kVA	3.8 kVA	5.1 kVA	6.7 kVA
Supply voltages Permitted range	V_{Mains}	AC 3 x 380 V / **400 V** / 415 V / 460 V / 500 V V_{Mains} = AC 380 V –10% – AC 500 V +10%							
Supply frequency	f_{Mains}	50-60 Hz ± 10%							
Rated mains current (with V_{Mains} = AC 400 V)	I_{Mains}	AC 1.3 A	AC 1.6 A	AC 1.9 A	AC 2.4 A	AC 3.5 A	AC 5.0 A	AC 6.7 A	AC 7.3 A
Output voltage	V_{Output}	0 – V_{Mains}							
Output frequency Resolution Operating point	f_A	2-120 Hz 0.01 Hz 400 V at 50 Hz / 100 Hz							
Rated output current	I_{Rated}	AC 1.6 A	AC 2.0 A	AC 2.5 A	AC 3.2 A	AC 4.0 A	AC 5.5 A	AC 7.3 A	AC 8.7 A
Motor power S1	P_{Mot}	**0.37 kW** 0.5 HP	**0.55 kW** 0.75 HP	**0.75 kW** 1.0 HP	**1.1 kW** 1.5 HP	**1.5 kW** 2.0 HP	**2.2 kW** 3.0 HP	**3.0 kW** 4.0 HP	**4.0 kW** 5.2 HP
PWM frequency		4/8/**16**[1] kHz (**factory setting 16 kHz**)							
Current limitation	I_{max}	**motor:** 160% at ⅄ and △ **regenerative:** 160% at ⅄ and △							
External braking resistor	R_{min}	150 Ω					68 Ω		
Cable length between MOVIFIT® and motor		Max. 15 m (with SEW hybrid cable, type A)							
Hybrid cable shielding		Apply outer shield with EMC cable gland; apply inner shield with EMC shield clamp (see section "Installation Instructions").							
Interference immunity		Fulfills EN 61800-3							
Interference emission		Limit value class C3 to EN 61800-3							
Motor protection		Thermistor							
Operating mode		S1 (EN 60034-1), S3 max. cycle duration 10 minutes							
Cooling type (DIN 41751)		Self-cooling							
Degree of protection		Standard: IP65 in accordance with EN 60529 (MOVIFIT® housing closed and all cable bushings and plug connections sealed)							
		Hygienic^{plus} version: IP66 in accordance with EN 60529 and IP69K in accordance with DIN 40050-9 (MOVIFIT® housing closed and all cable bushings sealed according to the relevant degree of protection)							
Ambient temperature		–25°C to +40°C (P_{Rated} reduction: 3% I_{Rated} per K to max. 60°C)							
Climate class		EN 60721-3-3, class 3K3							
Storage temperature[2]		–25°C to +85°C (EN 60721-3-3, class 3K3)							
Permissible oscillation and impact load		According to EN 50178							
Overvoltage category		III according to IEC 60664-1 (VDE 0110-1)							
Pollution class		2 according to IEC 60664-1 (VDE 0110-1) within the housing							
Installation altitude	h	Up to 1,000 m without restrictions (installation altitude at 1000 m and higher: see section "Installation instructions")							
Mass		EBOX "MTF...-....-00" (MOVIFIT®-FC) size 1: Approx. 3.5 kg EBOX "MTF...-....-00" (MOVIFIT®-FC) size 2: Approx. 5.6 kg ABOX "MTA...-S02.-...-00": Approx. 4.5 kg ABOX "MTA...-S42.-...-00", "MTA...-S52.-...-00", "MTA...-S62.-...-00": Approx. 4.8 kg ABOX "MTA...-H12.-...-00", "MTA...-H22.-...-00": Approx. 6.0 kg							

1) 16 kHz PWM frequency (low-noise): The unit switches to lower cycle frequencies depending on the heat sink temperature and load.

2) If the unit is being stored for a long time, connect it to the mains voltage for at least 5 minutes every 2 years. Otherwise, the unit's service life may be reduced.

9.3 Version with operating point 460 V/60 Hz

MOVIFIT® unit type		MTF11A 003-503	MTF11A 005-503	MTF11A 007-503	MTF11A 011-503	MTF11A 015-503	MTF11A 022-503	MTF11A 030-503	MTF11A 040-503
		Size 1					Size 2		
Apparent output power at V_{Mains} = AC 380-500 V	S_{Rated}	1.1 kVA	1.4 kVA	1.8 kVA	2.2 kVA	2.8 kVA	3.8 kVA	5.1 kVA	6.7 kVA
Supply voltages Permitted range	V_{Mains}	AC 3 x 380 V / 400 V / 415 V / **460 V** / 500 V V_{Mains} = AC 380 V –10% – AC 500 V +10%							
Supply frequency	f_{Mains}	50-60 Hz ± 10%							
Rated mains current (with V_{Mains} = AC 400 V)	I_{Mains}	AC 1.1 A	AC 1.4 A	AC 1.7 A	AC 2.1 A	AC 3.0 A	AC 4.3 A	AC 5.8 A	AC 6.9 A
Output voltage	V_{Output}	0 – V_{Mains}							
Output frequency Resolution Operating point	f_A	2-120 Hz 0.01 Hz 400 V at 50 Hz / 100 Hz							
Rated output current	I_{Rated}	AC 1.6 A	AC 2.0 A	AC 2.5 A	AC 3.2 A	AC 4.0 A	AC 5.5 A	AC 7.3 A	AC 8.7 A
Motor power S1	P_{Mot}	**0.37 kW** 0.5 HP	**0.55 kW** 0.75 HP	**0.75 kW** 1.0 HP	**1.1 kW** 1.5 HP	**1.5 kW** 2.0 HP	**2.2 kW** 3.0 HP	**3.7 kW** 5.0 HP	**4.0 kW** 5.4 HP
PWM frequency		4/8/**16**[1] kHz (**factory setting 16 kHz**)							
Current limitation	I_{max}	**motor:** 160% at ⅄ and △ **regenerative:** 160% at ⅄ and △							
External braking resistor	R_{min}	150 Ω					68 Ω		
Cable length between MOVIFIT® and motor		Max. 15 m (with SEW hybrid cable, type A)							
Hybrid cable shielding		Apply outer shield with EMC cable gland; apply inner shield with EMC shield clamp (see section "Installation Instructions").							
Interference immunity		Fulfills EN 61800-3							
Interference emission		Limit value class C3 to EN 61800-3							
Motor protection		Thermistor							
Operating mode		S1 (EN 60034-1), S3 max. cycle duration 10 minutes							
Cooling type (DIN 41751)		Self-cooling							
Degree of protection		Standard: IP65 in accordance with EN 60529 (MOVIFIT® housing closed and all cable bushings and plug connections sealed)							
		Hygienic^{plus} version: IP66 in accordance with EN 60529 and IP69K in accordance with DIN 40050-9 (MOVIFIT® housing closed and all cable bushings sealed according to the relevant degree of protection)							
Ambient temperature		–25°C to +40°C (P_{Rated} reduction: 3% I_{Rated} per K to max. 60°C)							
Climate class		EN 60721-3-3, class 3K3							
Storage temperature[2]		–25°C to +85°C (EN 60721-3-3, class 3K3)							
Permissible oscillation and impact load		According to EN 50178							
Overvoltage category		III according to IEC 60664-1 (VDE 0110-1)							
Pollution class		2 according to IEC 60664-1 (VDE 0110-1) within the housing							
Installation altitude	h	Up to 1,000 m without restrictions (installation altitude at 1000 m and higher: see section "Installation instructions")							
Mass		EBOX "MTF...-....-00" (MOVIFIT®-FC) size 1: Approx. 3.5 kg EBOX "MTF...-....-00" (MOVIFIT®-FC) size 2: Approx. 5.6 kg ABOX "MTA...-S02.-...-00": Approx. 4.5 kg ABOX "MTA...-S42.-...-00", "MTA...-S52.-...-00", "MTA...-S62.-...-00": Approx. 4.8 kg ABOX "MTA...-H12.-...-00", "MTA...-H22.-...-00": Approx. 6.0 kg							

1) 16 kHz PWM frequency (low-noise): The unit switches to lower cycle frequencies depending on the heat sink temperature and load.

2) If the unit is being stored for a long time, connect it to the mains voltage for at least 5 minutes every 2 years. Otherwise, the unit's service life may be reduced.

9.4 General electronics data

General electronics data	
Electronics and sensor supply 24V_C (continous)	V_{IN} = DC 24 V –15% / +20% according to EN 61131-2 I_{In} ≤ 500 mA, typically 200 mA (for MOVIFIT® electronics) plus up to 1,500 mA (3 x 500 mA) for sensor supply (depending on number and type of connected sensors) **Important: Add the following currents to supply 24V_S and 24V_P from 24V_C.**
Actuator supply 24V_S (switched)	V_{IN} = DC 24 V –15% / +20% according to EN 61131-2 I_{In} ≤ 2000 mA (4 outputs with 500 mA or 1 x sensor supply - group 4 with 500 mA)
Inverter supply 24V_P	V_{IN} = DC 24 V –15% / +20% according to EN 61131-2 I_E ≤ 250 mA, typically 180 mA
Electrical isolation	Separate potentials for: • Fieldbus connection (X30, X31) potential-free • SBUS connection (X35/1-3) potential-free • 24V_C for MOVIFIT® electronics, diagnostic interface (X50), and digital inputs (DI..) – groups I to III • 24V_S for digital outputs (DO..) and digital inputs (DI..) – group IV • 24V_P for integrated frequency inverters
Shielding of bus cables	Apply using EMC metal cable glands or EMC shield clamps (see section "Installation instructions").

9.5 Digital inputs

Digital inputs	Function level "Classic" with PROFIBUS or DeviceNet	Function level "Technology" or "System" with PROFIBUS or DeviceNet Function level "Classic", "Technology", or "System" with PROFINET, EtherNet/IP, or Modbus/TCP
Number of inputs	6 – 8	12 – 16
Input type	PLC-compatible according to EN 61131-2 (digital inputs type 1) R_i approx. 4 kΩ, sampling time ≤ 5 ms Signal level +15 V – +30 V "1" = contact closed –3 V – +5 V "0" = contact open	
Number of simultaneously controllable inputs	8	16 with 24 V 8 with 28.8 V
Sensor supply (4 groups) **Rated current** **Permitted total current** **Internal voltage drop**	DC 24 V to EN 61131-2, interference voltage proof and short-circuit proof 500 mA per group 1 A Max. 2 V	
Potential reference	Groups I to III → 24V_C Group IV → 24V_S	

9.6 Digital outputs DO00-DO03

Digital outputs	Function level "Classic" with PROFIBUS or DeviceNet	Function level "Technology" or "System" with PROFIBUS or DeviceNet Function level "Classic", "Technology", or "System" with PROFINET, EtherNet/IP, or Modbus/TCP
Number of outputs	0 – 2	0 – 4
Output type **Rated current** **Permitted total current** **Leakage current** **Internal voltage drop**	PLC-compatible to EN 61131-2, interference voltage proof and short-circuit proof 500 mA 1 A Max. 0.2 mA Max. 2 V	
Potential reference	24V_S	

9.7 Digital output DB00

Digital output	
Output type **Rated current** **Leakage current** **Internal voltage drop**	PLC-compatible in accordance with EN 61131-2, interference voltage proof and short-circuit proof 150 mA Max. 0.2 mA Max. 2 V
Potential reference	24V_C

9.8 Interfaces

Interface	
SBus interface **(not with function level "Classic")** **Transmission technology** **Bus termination**	Interface to other SBus-capable SEW units CAN bus to CAN specification 2.0, parts A and B ISO 11898-compliant 120 Ω terminating resistor in conjunction with ABOX "MTA...-S02.-...-00" is already installed and can be activated via the switch. With all other ABOX versions, you must use an external terminating resistor.
RS-485 diagnostic interface	Diagnostic interface, not electrically isolated from MOVIFIT® electronics

9.8.1 PROFIBUS interface

PROFIBUS			
Function level	**Classic**	**Technology**	**System**
PROFIBUS protocol option	PROFIBUS DP/DPV1		
Supported baud rates	9.6 kBaud – 1.5 MBaud / 3-12 MBaud (with automatic detection)		
Bus termination	In conjunction with the standard ABOX "MTA...-S02.-...-00", this is already installed and can be activated via the switch. With all other ABOX versions, you must use an external terminating resistor.		
Maximum line length 9.6 kBaud: 19.2 kBaud: 93.75 kBaud: 187.5 kBaud: 500 kBaud: 1.5 MBaud: 12 MBaud:	 1,200 m 1,200 m 1,200 m 1,000 m 400 m 200 m 100 m To extend the length, several segments can be coupled using repeaters. The maximum expansion/cascading depth can be found in the manuals for the DP master or the repeater modules.		
Address setting	Addresses 1 to 125 can be set using DIP switches in the connection box.		
DP ID number	Classic $600A_{hex}$ (24586_{dec})	Technology $600B_{hex}$ (24587_{dec})	System $077A_{hex}$ (1914_{dec})
GSD file name	Classic SEW_600A.GSD	Technology SEW_600B.GSD	System SEW_077A.GSD
Bitmap file name	Classic SEW600AN.BMP SEW600AS.BMP	Technology SEW600BN.BMP SEW600BS.BMP	-

9.8.2 PROFINET interface

PROFINET		
Function level	**Classic**	**Technology**
PROFINET protocol option	PROFINET IO RT	
Supported baud rates	100 MBit/s (full duplex)	
SEW ID number	$010A_{hex}$	
Unit ID number	2	
Connection technology	M12, RJ45 (push-pull) and RJ45 plug connectors (in the ABOX)	
Integrated switch	Supports autocrossing, autonegotiation	
Permitted cable types	Category 5 and higher, class D in accordance with IEC 11801	
Maximum line length **(from switch to switch)**	100 m in accordance with IEEE 802.3	
GSD file name	GSDML-V2.1-SEW-MTX-yyyymmdd.xml	GSDML-V2.1-SEW-MTX-yyyymmdd.xml
Bitmap file name	SEW-MTX-Classic.bmp	SEW-MTX-Technology.bmp

9.8.3 EtherNet/IP interface

EtherNet/IP	
Function level	**Technology**
Automatic baud rate detection	10 MBaud/100 MBaud
Connection technology	M12, RJ45 (push-pull) and RJ45 plug connectors (in the ABOX)
Integrated switch	Supports autocrossing, autonegotiation
Maximum line length	100 m in accordance with IEEE 802.3
Addressing	4-byte IP address or MAC ID (00-0F-69-xx-xx-xx) Can be configured using DHCP server or MOVITOOLS® MotionStudio with version 5.5 and higher, default address 192.168.10.4 (dependent on the setting of DIP switch S11)
Manufacturer ID (vendor ID)	$013B_{hex}$
Name of EDS files	SEW_MOVIFIT_TECH_ENIP.eds
Name of icon files	SEW_MOVIFIT_TECH_ENIP.ico

9.8.4 Modbus/TCP interface

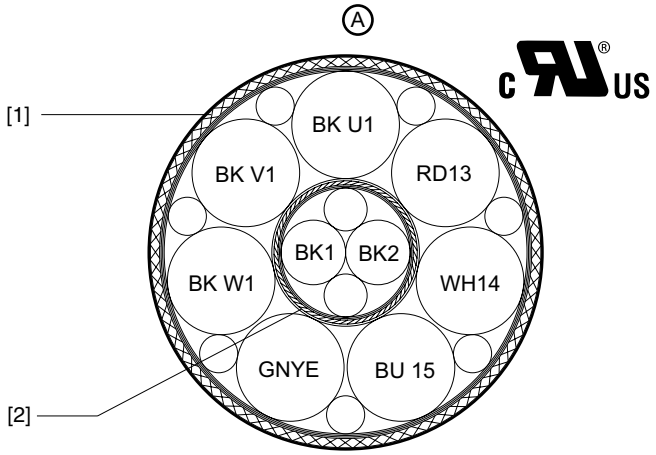
Modbus/TCP	
Function level	**Technology**
Automatic baud rate detection	10 MBaud/100 MBaud
Connection technology	M12, RJ45 (push-pull) and RJ45 plug connectors (in the ABOX)
Integrated switch	Supports autocrossing, autonegotiation
Maximum line length	100 m in accordance with IEEE 802.3
Addressing	4-byte IP address or MAC ID (00-0F-69-xx-xx-xx) Can be configured using DHCP server or MOVITOOLS® MotionStudio with version 5.5 and higher, default address 192.168.10.4 (dependent on the setting of DIP switch S11)
Manufacturer ID (vendor ID)	$013B_{hex}$
Supported services	FC3, FC16, FC23, FC43

9.8.5 DeviceNet interface

DeviceNet		
Function level	**Classic**	**Technology**
Protocol option	Master-slave connection set with polled I/O and bit-strobe I/O	
Supported baud rates	500 kBaud 250 kBaud 125 kBaud	
Maximum line length 500 kBaud 250 kBaud 125 kBaud	See DeviceNet specification V 2.0. 100 m 250 m 500 m	
Bus termination	120 Ω (external connection)	
Process data configuration	See "MOVIFIT® Function Level Classic..."	or "MOVIFIT® Function Level Technology..." manual.
Bit-strobe response	Checkback signal of the unit status via bit-strobe I/O data	
Address setting	DIP switch	
Name of EDS files	SEW_MOVIFIT_Classic.eds	SEW_MOVIFIT_TECH_DNET.eds
Name of icon files	SEW_MOVIFIT_Classic.ico	SEW_MOVIFIT_TECH_DNET.ico

9.9 Cable type "A" hybrid cable

9.9.1 Mechanical design



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[1] Overall shield
[2] Shield

- SEW work standard W3251 (817 953 0)
- Supply cores: 7 x 1.5 mm^2
- Control core pair: 2 x 0.75 mm^2
- Insulation: TPE-E (polyolefin)
- Conductor: Bare E-Cu strand, extra fine wires with individual wire 0.1 mm
- Shield: Tinned E-Cu wire
- Overall diameter: Max. 15.9 mm
- Color of outer cable sheath: Black

9.9.2 Electrical properties

- Conductor resistance for 1.5 mm^2 (at 20°C): max. 13 Ω/km
- Conductor resistance for 0.75 mm^2 (at 20°C): max. 26 Ω/km
- Operating voltage for 1.5 mm^2 core: Max. 600 V according to c UL us
- Operating voltage for 0.75 mm^2 core: Max. 600 V according to c UL us
- Insulation resistance at 20°C: Min. 20 MΩ x km

9.9.3 Mechanical properties

- Suitable for cable carriers
  - Bending cycles > 2.5 million
  - Traveling velocity ≤ 3 m/s

- Bending radius in the cable carrier: 10 x diameter
  for fixed routing: 5 x diameter

- Torsional strength (e.g. rotary table applications)
  - Torsion ±180° at a cable length of > 1 m
  - Torsional cycles > 100,000

	TIP
	If reversed bending and high torsional load occur for a length of < 3 m, check the mechanical peripheral conditions more closely. Please contact SEW-EURODRIVE in such cases.

9.9.4 Thermal properties

- Processing and operation: –30°C – +90°C (load capacity according to DIN VDE 0298-4)
  –30°C – +80°C according to cULus
- Transport and storage: –40°C – +90°C (load capacity according to DIN VDE 0298-4)
  –30°C – +80°C according to cULus
- Flame-retardant according to UL1581 Vertical Wiring Flame Test (VW-1)
- Flame-retardant according to CSA C22.2 Vertical Flame Test (FT-1)

9.9.5 Chemical properties

- Oil-resistant according to VDE 0472 part 803 method B
- General resistance to fuels (such as diesel and gasoline) in accordance with DIN ISO 6722 parts 1 and 2
- General resistance to acids, alkalis, cleaning agents
- General resistance to dusts (e.g. bauxite and magnesite)
- Insulation and cable jacket material is halogen free in accordance with VDE 0472 part 815
- Within the specified temperature range, free from substances interfering with wetting agents (silicon-free)

9.10 Braking torques

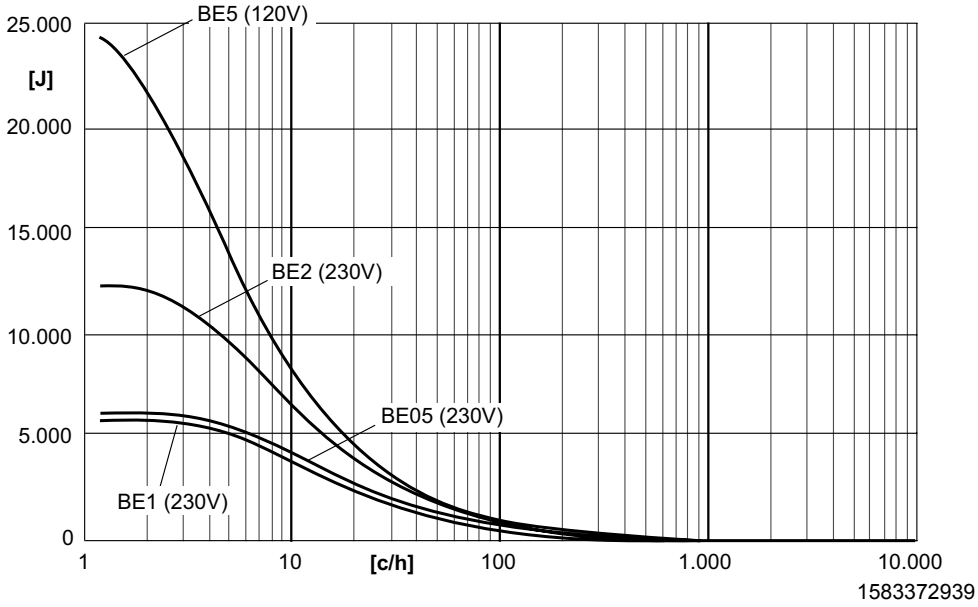
The following table lists the technical data of the brakes. The type and number of brake springs determines the level of the braking torque. Maximum braking torque $M_{B\ max}$ is installed as standard, unless specified otherwise in the order. Other brake spring combinations can produce the reduced braking torque values $M_{B\ red}$.

Brake Type	For motor size	$M_{B\ max}$ [Nm]	Reduced braking torques $M_{B\ red}$ [Nm]						
BMG02	**DT56**	1.2	0.8						
BR03	**DR63**	3.2	2.4	1.6	0.8				
BMG05	**DT71 / DT80**	5.0	4	2.5	1.6	1.2			
BMG1	**DT80**	10	7.5	6					
BMG2	**DT90 / DV100**	20	16	10	6.6	5			
BMG4	**DV100**	40	30	24					
BMG8	**DV112M**	55	45	37	30	19	12.6	9.5	
	DV132S	75	55	45	37	30	19	12.6	9.5
BE05	**DRS71S4**	5.0	3.5	2.5	1.8				
BE1	**DRS71M4 – DRP90M4**	10	7.0	5.0					
BE2	**DRS80M4 – DRP100M4**	20	14	10	7.0				
BE5	**DRS90L4 – DRS112M4** **DRE100M4 – DRE132S4** **DRP100L4 – DRP112M4**	55	40	28	20				
BE11	**DRS132S4**	110	80	55	40				

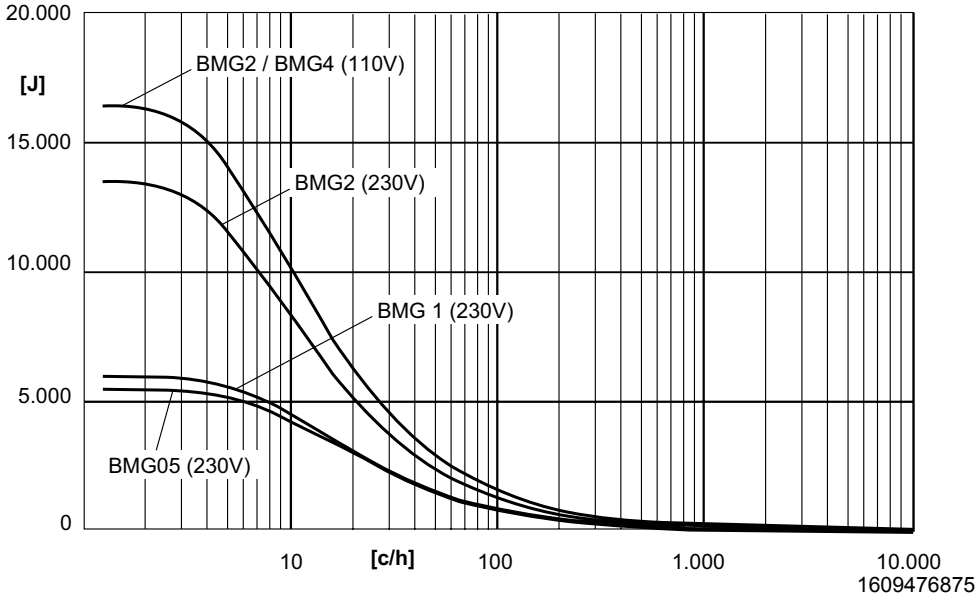
$M_{B\ max}$ Maximum braking torque $M_{B\ red}$ Reduced braking torque

9.11 4-Q operation with motors with a mechanical brake

- The brake coil can be used as a braking resistor in 4-Q operation.
- Brake voltage is generated internally within the unit, which means it is mains-independent.
- The following figures show the regenerative load capacities of the internal brake coils. If the regenerative load capacity is not sufficient for the application, connect an additional braking resistor (see the following section).
- The following figure shows the load capacity of the brake coils from DR motors:

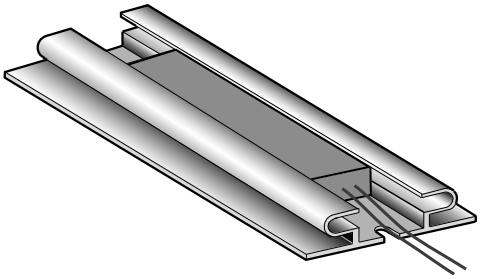


- The following figure shows the load capacity of the brake coils from DT/DV motors:



9.12 Internal braking resistors

9.12.1 Assignment



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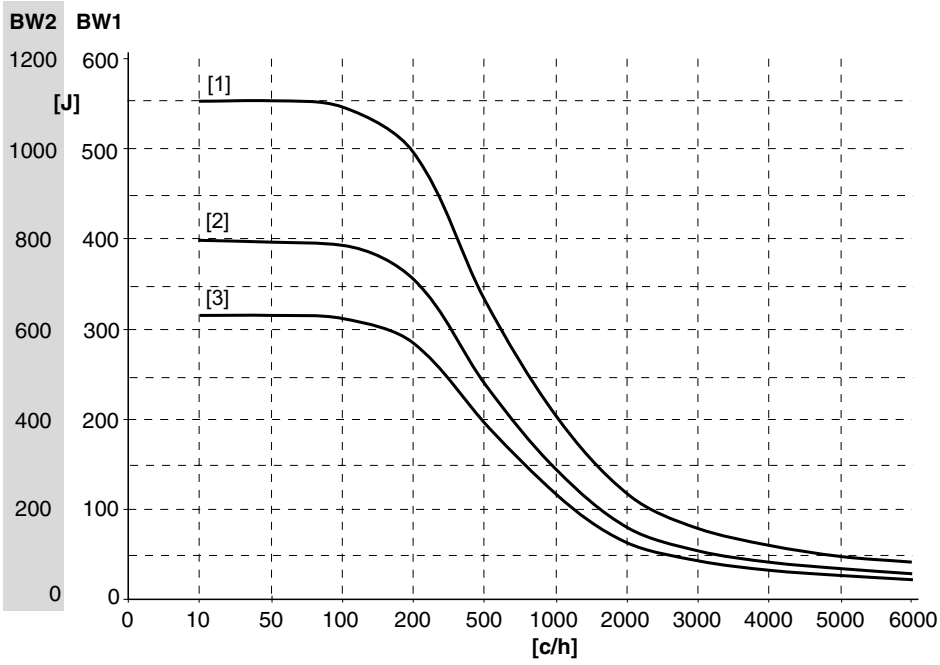
MOVIFIT® unit type	Braking resistor	Part number
MFT11A003... to MFT11A015...	BW1T	1820 705 7
MFT11A022... to MFT11A040...	BW2T	1820 754 5

9.12.2 Regenerative load capacity



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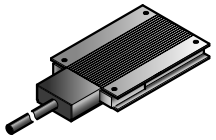
[c/h] Cycles/hour
[1] Brake ramp 10 s
[2] Brake ramp 4 s
[3] Brake ramp 0.2 s

9.13 External braking resistors

9.13.1 Assignment

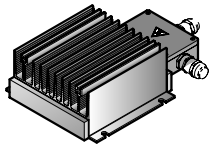
MOVIFIT® unit type	Braking resistor	Part number	Protective grid
MFT11A003... to MFT11A015...	BW200-003/K-1.5	0 828 291 9	0 813 152 X
	BW200-005/K-1.5	0 828 283 8	-
	BW150-010	0 802 285 2	-
MFT11A022... to MFT11A040...	BW100-003/K-1.5	0 828 293 5	0 813 152 X
	BW100-005/K-1.5	0 828 286 2	-
	BW068-010	0 802 287 9	-
	BW068-020	0 802 286 0	-

9.13.2 BW100... BW200...



	BW100-003/ K-1.5	BW100-005/ K-1.5	BW200-003/ K-1.5	BW200-005/ K-1.5
Part number	0 828 293 5	0 828 286 2	0 828 291 9	0 828 283 8
Function	Dissipating the regenerative energy			
Degree of protection	IP65			
Resistance	100 Ω	100 Ω	200 Ω	200 Ω
Power in S1, 100% cdf	100 W	200 W	100 W	200 W
Dimensions W x H x D	146 x 15 x 80 mm	152 x 15 x 80 mm	146 x 15 x 80 mm	152 x 15 x 80 mm
Cable length	1.5 m			

9.13.3 BW150... BW068...



	BW150-010	BW068-010	BW068-020
Part number	0 802 285 2	0 802 287 9	0 802 286 0
Function	Dissipating the regenerative energy		
Degree of protection	IP66		
Resistance	150 Ω	68 Ω	68 Ω
Power according to UL in S1, 100% cdf	600 W	600 W	1200 W
Power according to CE in S1, 100% cdf	900 W	900 W	1800 W
Dimensions W x H x D	260 x 75 x 174 mm	260 x 75 x 174 mm	610 x 75 x 174 mm

9.14 Hygienic^{plus} version

9.14.1 Properties of sealing materials and surfaces

Sealing material property

EPDM is the standard sealing material for the Hygienic^{plus} version. The following table shows a selection of various EPDM properties. Take this information into account when planning your system.

Property	EPDM stability
Alkali resistance	Very good
Resistance to ageing	Very good
Ammonia (water-free)	Very good
Ethanol	Very good
Gasoline resistance	Low
Vapor	Up to 130°C
Hot water	Very good
Lye	Very good
Carbonic acid	Very good
Methanol	Very good
Sodium chloride	Very good
Oil (vegetable, ethereal)	Good to medium
Oil and grease resistance	Low
Ozone resistance	Very good
Phosphoric acid (50%)	Very good
Nitric acid (40%)	Good
Hydrochloric acid (38%)	Very good
Acid resistance	Very good
Sulfuric acid (30%)	Very good
Silicone oils and greases	Very good
Drinking water	Very good
Suds (laundry detergent)	Very good
Sugar (watery)	Very good
Permitted temperature range	–25 to +150°C

TIP

The low rated stability of EPDM in case of contact with mineral oils, gasoline, grease, etc. results from the fact that EPDM swells when it comes into contact with these materials. However, these chemicals do not destroy EPDM.

Surface properties

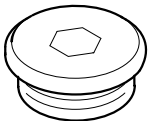
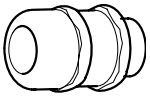
- Advanced anti-adhesive surface properties
- Surface roughness
  - R_a < 1.6 to 2
- Resistance to acidic and alkaline cleaning agents
  - Sulfuric acid (10%)
  - Caustic soda (10%)

  Never mix cleaning and disinfecting agents.

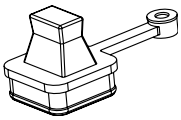
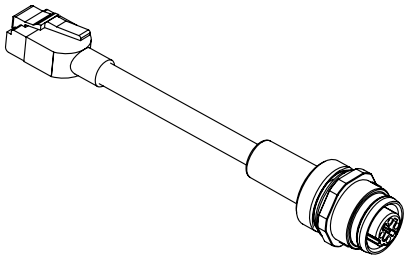
  Never mix acids and chlorine alkalis, as poisonous chlorine gas will result.

  Strictly observe the safety instructions of the cleaning agent manufacturer.
- Resistance to materials at installation location
  - Grease
  - Mineral oils
  - Edible oils
  - Gasoline
  - Alcohol
  - Solvents
- Resilient against shock and impact load
- Impact-resistant
- Resistant to temperature change
  - –25 to +60°C
  - Increased temperature for cleaning processes: 80°C
- Water-jet-resistant
  - Approx. 100 l/min
- Steam cleaning (according to DIN 40050 part 9)
  - Max. 80-100 bar (approx. 15 l/min)
  - Max. 80°C (30 seconds)
- Light-resistant
  - Direct sunlight

9.14.2 Optional metal cable glands

Type	Figure	Contents	Size	Part number
Stainless steel screw plugs		10 pieces	M16 x 1.5	1820 223 3
		10 pieces	M20 x 1.5	1820 224 1
		10 pieces	M25 x 1.5	1820 226 8
EMC cable gland (brass, nickel plated)		10 pieces	M16 x 1.5	1820 478 3
		10 pieces	M20 x 1.5	1820 479 1
		10 pieces	M25 x 1.5	1820 480 5

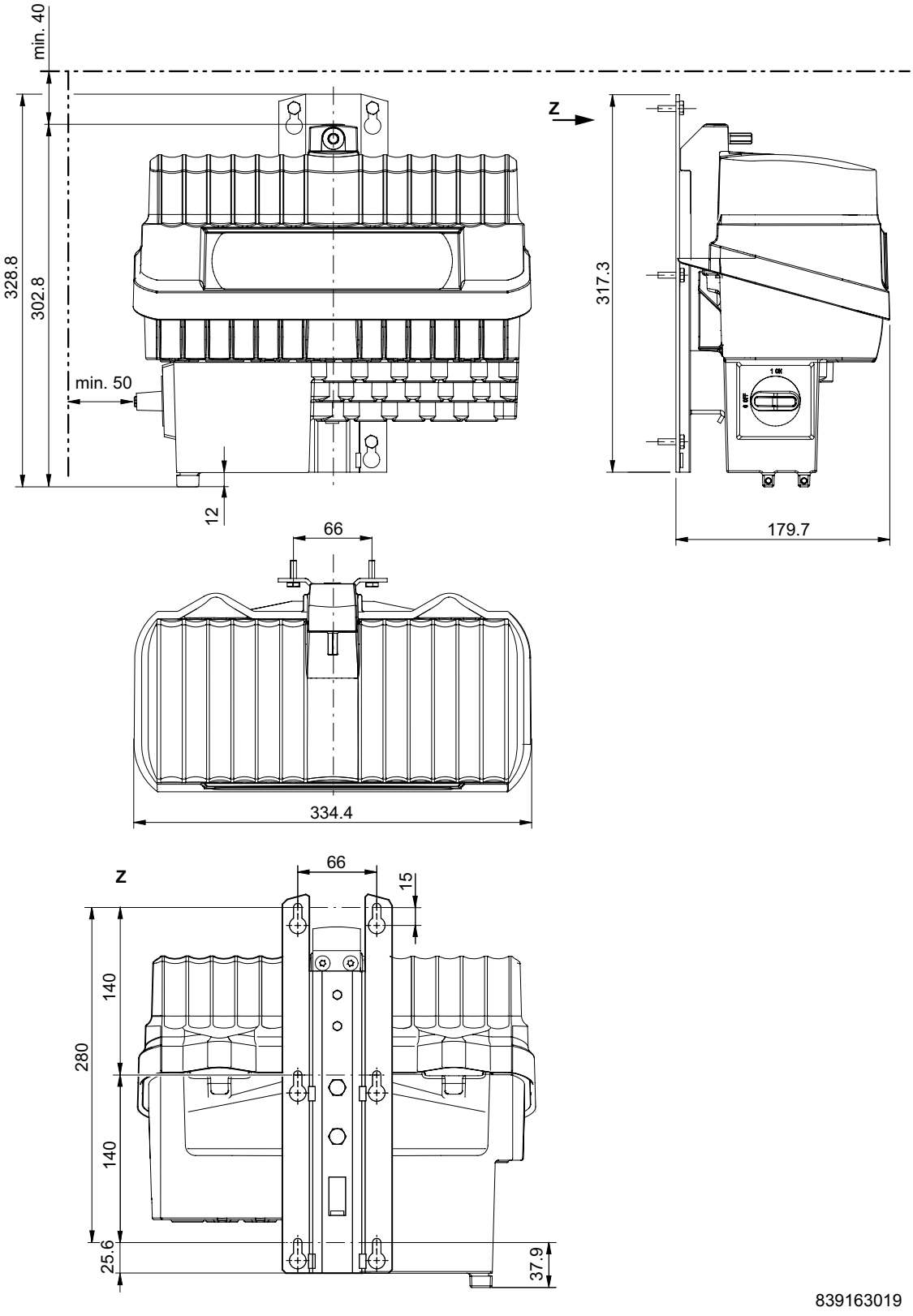
9.15 Options

Type	Figure	Contents	Part number
Ethernet closing plug for push-pull RJ45 socket		10 pieces	1822 370 2
		30 pieces	1822 371 0
Ethernet adapter RJ45-M12 RJ45 (internal) M12 (external) For each unit, two pieces are required.		1 piece	1328 168 2

9.16 Dimension drawings

9.16.1 Dimension drawing in conjunction with standard or hybrid ABOX (S02, S42, S52, S62)

Size 1 (MOVIFIT®-FC 0.37-1.5 kW), standard



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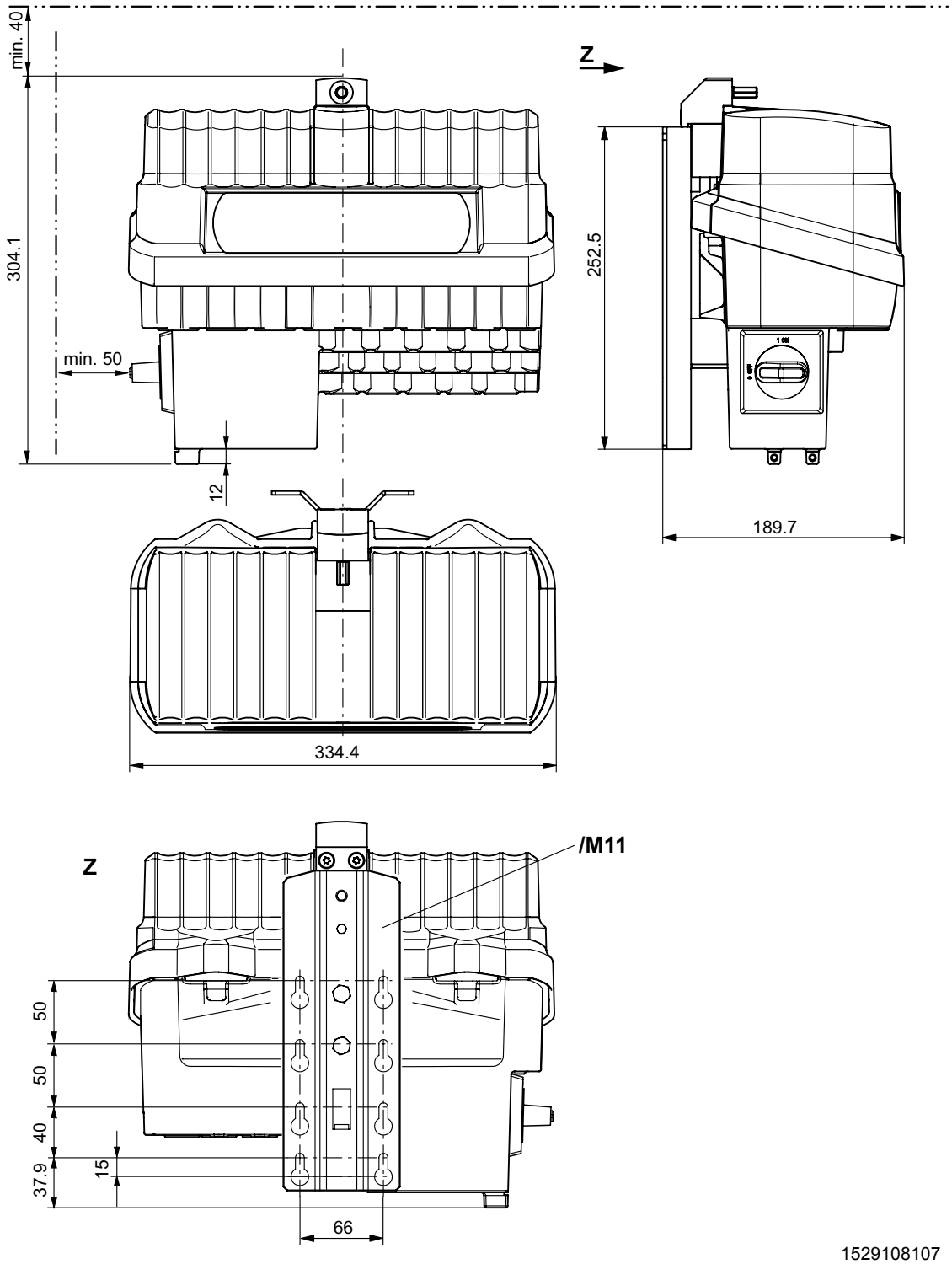
Size 1 (MOVIFIT®-FC 0.37-1.5 kW) with optional M11 stainless steel mounting rail



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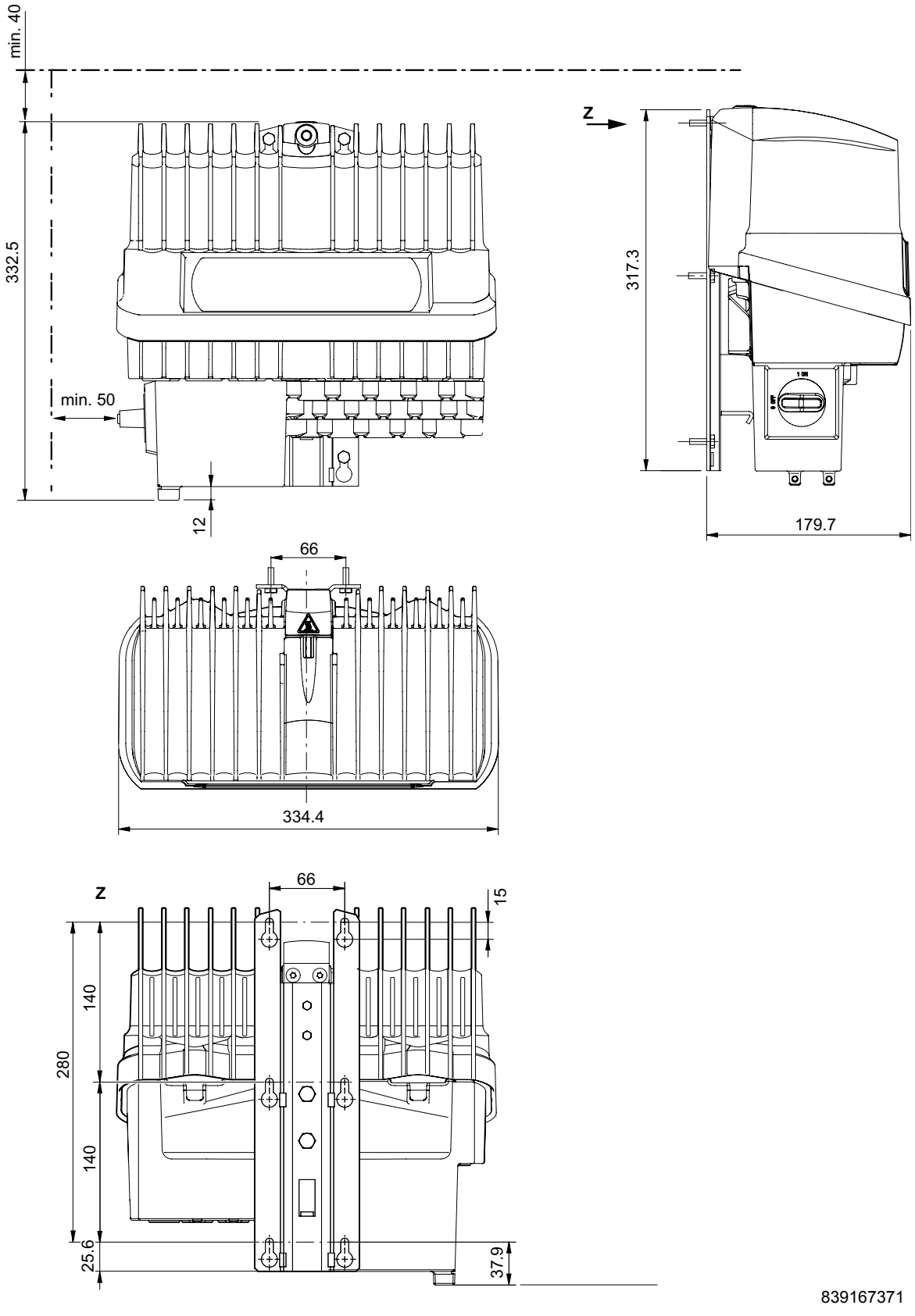
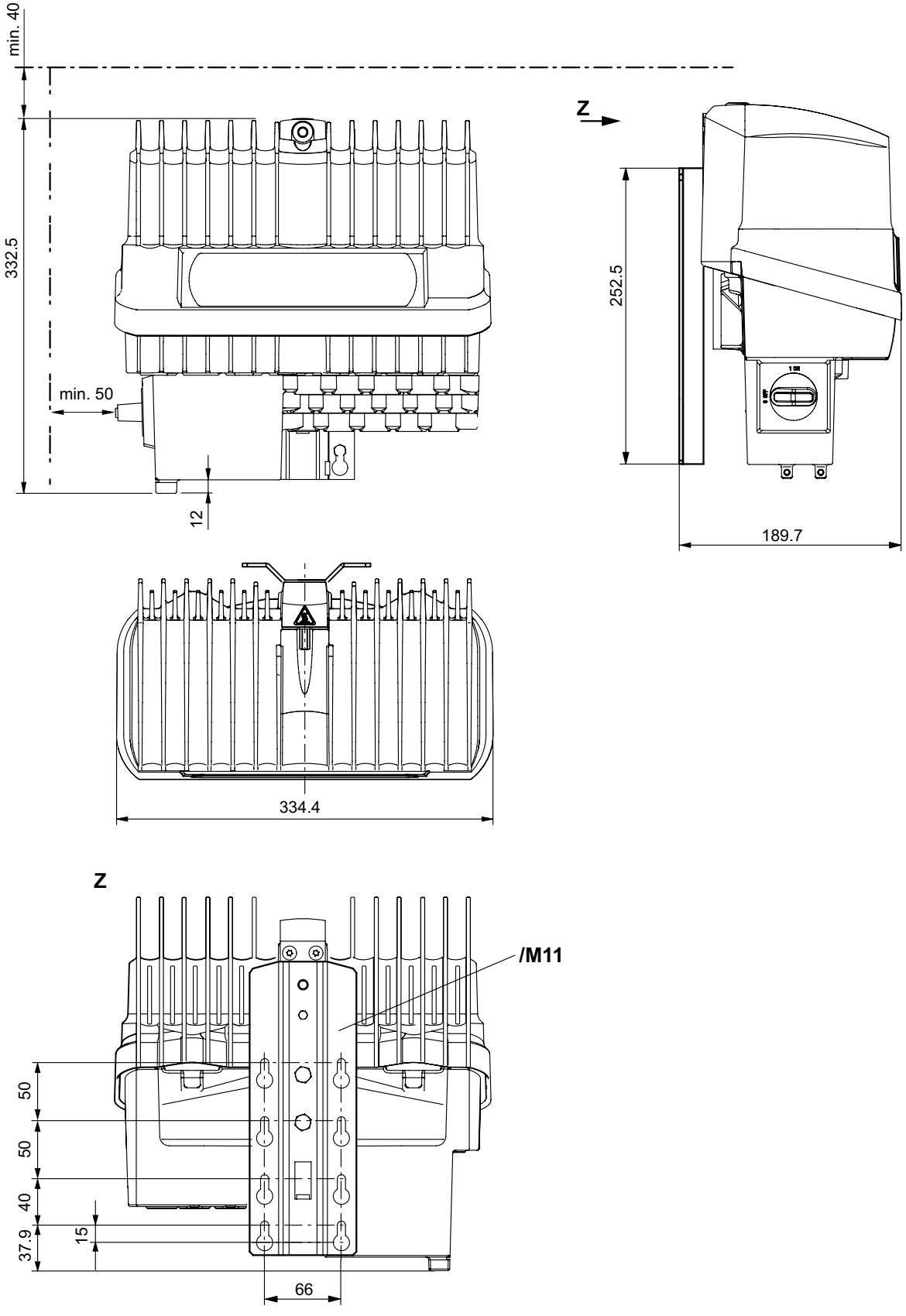
Size 2 (MOVIFIT®-FC 2.2-4 kW), standard



Size 2 (MOVIFIT®-FC 2.2-4 kW) with optional M11 stainless steel mounting rail



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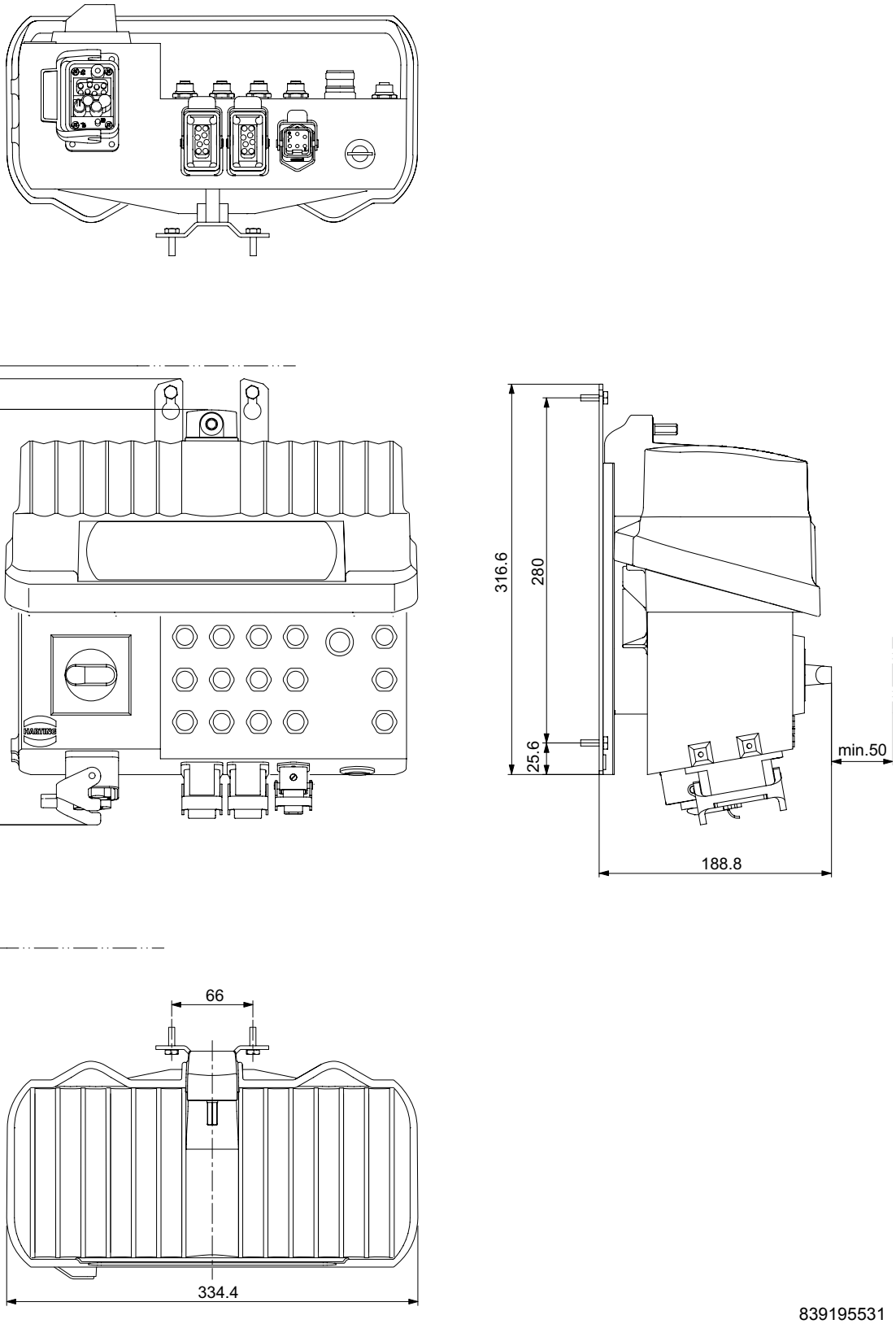
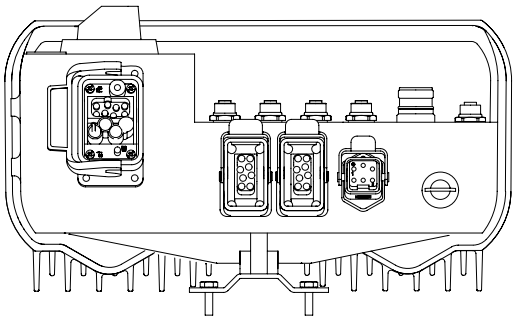
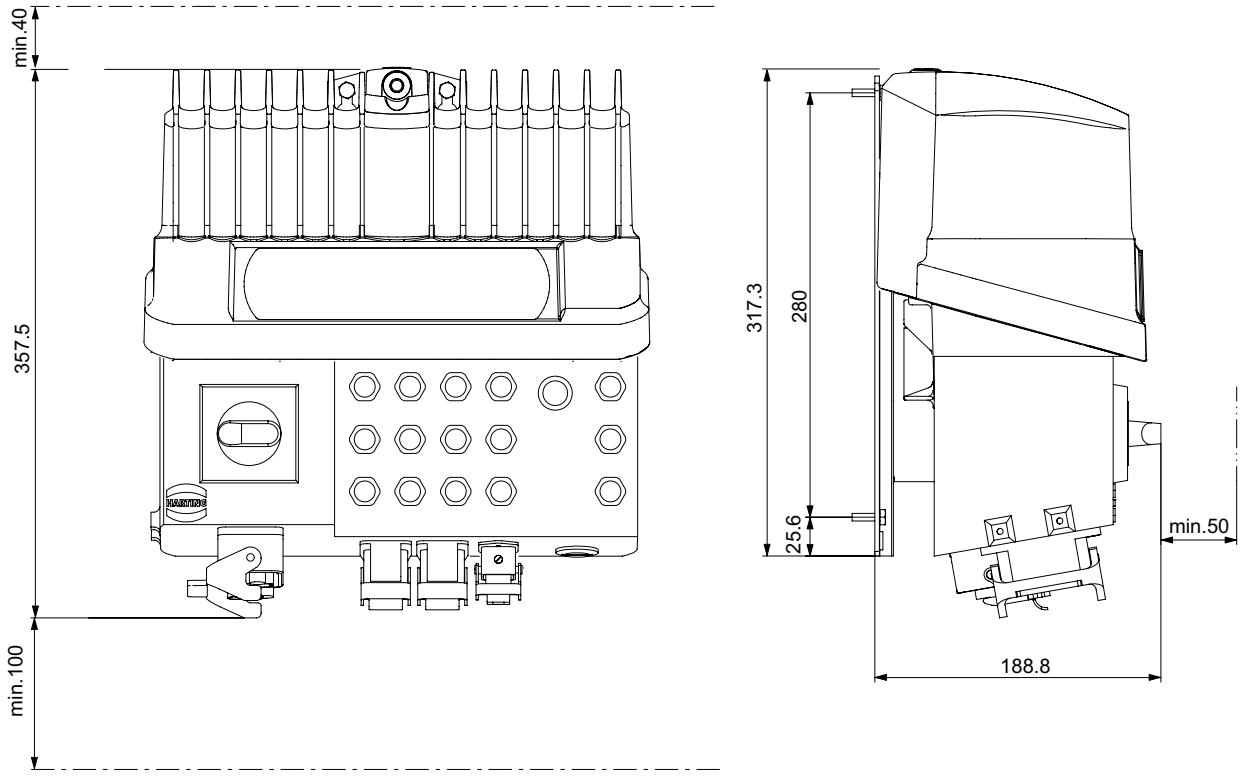
9.16.2 Dimension drawing in conjunction with Han-Modular®-ABOX (H12 and H22)

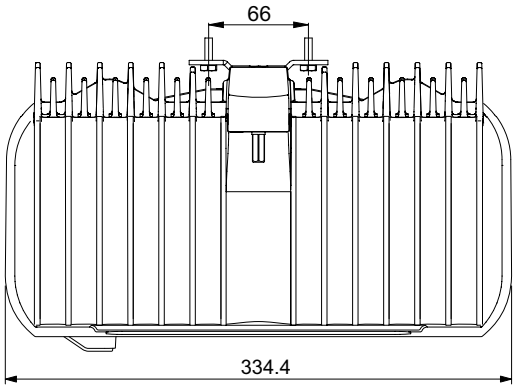
Size 1 (MOVIFIT®-FC 0.37-1.5 kW)



Size 2 (MOVIFIT®-FC 2.2-4 kW)







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10 Address List

Germany			
Headquarters **Production** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Service Competence Center	**Central**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte@sew-eurodrive.de
	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
	Drive Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357
	Additional addresses for service in Germany provided on request!		

France			
Production **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54, route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production	**Forbach**	SEW-EUROCOME Zone Industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62, avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Paris	SEW-USOCOME Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France provided on request!		

Algeria			
Sales	**Alger**	Réducom 16, rue des Frères Zaghnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84 reducom_sew@yahoo.fr

Argentina			
Assembly **Sales** **Service**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://sew-eurodrive.at sew@sew-eurodrive.at

Belarus			
Sales	**Minsk**	SEW-EURODRIVE BY RybalkoStr. 26 BY-220033 Minsk	Tel.+375 (17) 298 38 50 Fax +375 (17) 29838 50 sales@sew.by

Belgium			
Assembly **Sales** **Service**	**Brüssel**	SEW Caron-Vector S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.be info@caron-vector.be
Service Competence Center	**Industrial Gears**	SEW Caron-Vector S.A. Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be

Brazil			
Production **Sales** **Service**	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presidente Dutra Km 208 Guarulhos - 07251-250 - SP SAT - SEW ATENDE - 0800 7700496	Tel. +55 11 6489-9133 Fax +55 11 6480-3328 http://www.sew-eurodrive.com.br sew@sew.com.br
	Additional addresses for service in Brazil provided on request!		

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@fastbg.net

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca marketing@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 604 946-5535 Fax +1 604 946-2513 marketing@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 marketing@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25322611 info@sew-eurodrive.cn http://www.sew-eurodrive.cn
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267891 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478398 Fax +86 27 84478388
	Additional addresses for service in China provided on request!		

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sewcol@sew-eurodrive.com.co

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr

Czech Republic			
Sales	**Praha**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Lužná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 255 709 601 Fax +420 220 121 237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz

Denmark			
Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Egypt			
Sales **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 El Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 + 1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 sew@sew.fi http://www.sew-eurodrive.fi
Production **Assembly** **Service**	**Karkkila**	SEW Industrial Gears OY Valurinkatu 6 FIN-03600 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville**	Electro-Services B.P. 1889 Libreville	Tel. +241 7340-11 Fax +241 7340-12

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Greece			
Sales **Service**	**Athen**	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 2 7960477 + 79604654 Fax +852 2 7959129 contact@sew-eurodrive.hk

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu

India			
Assembly **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 2831086 Fax +91 265 2831087 http://www.seweurodriveindia.com sales@seweurodriveindia.com subodh.ladwa@seweurodriveindia.com

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il

Italy			
Assembly **Sales** **Service**	**Milano**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36

Japan			
Assembly **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp

Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master@sew-korea.co.kr
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139253 Fax +371 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 gacar@beirut.com

Lithuania			
Sales	**Alytus**	UAB Irseva Naujoji 19 LT-62175 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.lu info@caron-vector.be

Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my

Mexico			
Assembly **Sales** **Service**	**Queretaro**	SEW-EURODRIVE MEXIKO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Queretaro C.P. 76220 Queretaro, Mexico	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx

Morocco			
Sales	**Casablanca**	Afit 5, rue Emir Abdelkader MA 20300 Casablanca	Tel. +212 22618372 Fax +212 22618351 ali.alami@premium.net.ma

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 67710-90 Fax +48 42 67710-99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	24 Hour Service		Tel. +48 602 739 739 (+48 602 SEW SEW) sewis@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucureşti**	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn

Serbia			
Sales	**Beograd**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SCG-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.co.yu

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

Slovakia			
Sales	**Bratislava**	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-83554 Bratislava	Tel. +421 2 49595201 Fax +421 2 49595200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o. ul. Vojtecha Spanyola 33 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-97411 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za dross@sew.co.za
	Capetown	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 dswanepoel@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@sew.co.za

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442 00 Fax +46 36 3442 80 http://www.sew-eurodrive.se info@sew-eurodrive.se

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch

Thailand			
Assembly **Sales** **Service**	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service 5, Rue El Houdaibiah 1000 Tunis	Tel. +216 71 4340-64 + 71 4320-29 Fax +216 71 4329-76 tms@tms.com.tn

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419164, 3838014, 3738015 Fax +90 216 3055867 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr

Ukraine			
Sales **Service**	**Dnepropetrovsk**	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua

USA			
Production **Assembly** **Sales** **Service**	**Greenville**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manuf. +1 864 439-9948 Fax Ass. +1 864 439-0566 Telex 805 550 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**San Francisco**	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Philadelphia/PA	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net

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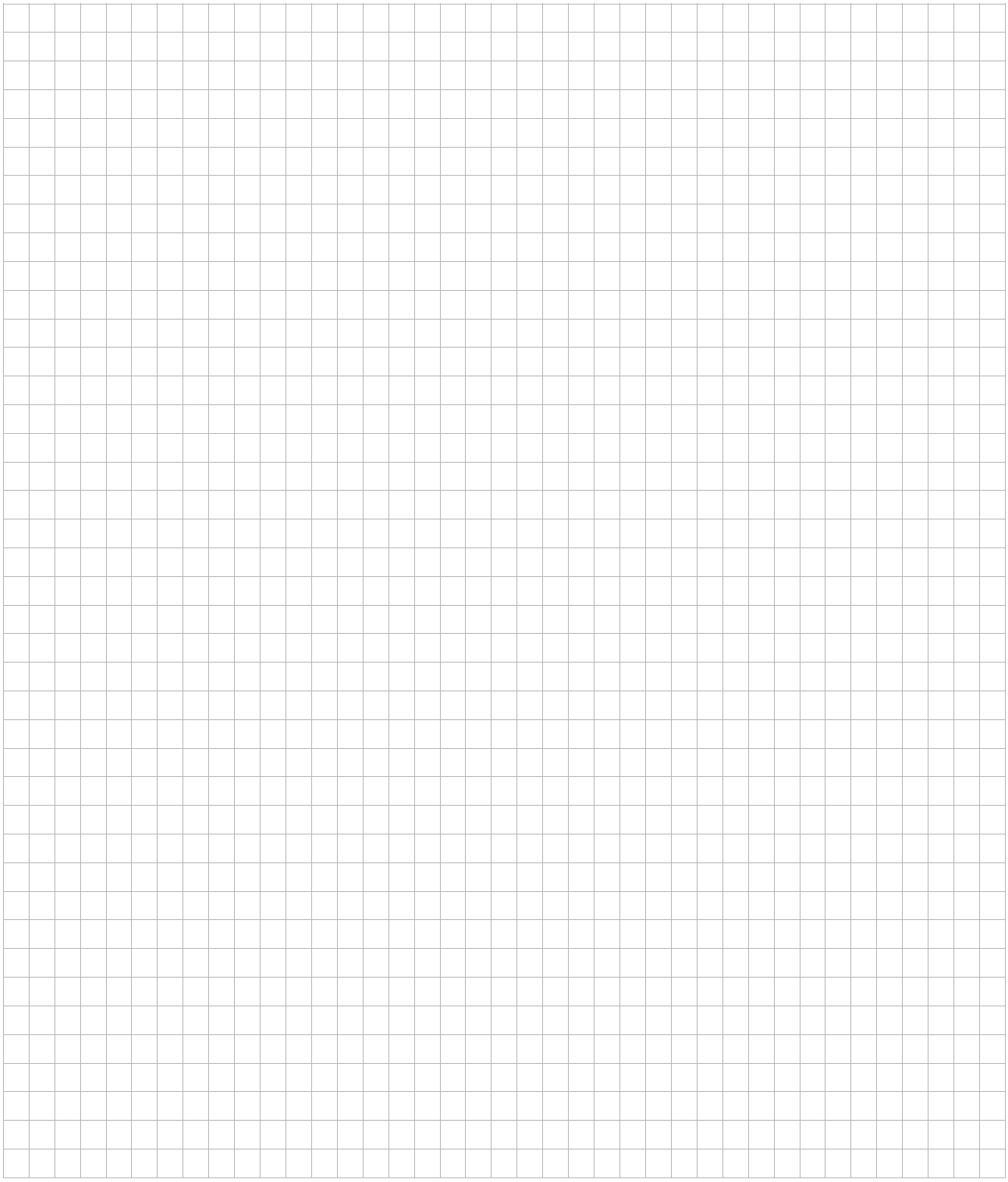

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